



88046828

J. E. Hall

LAND PLANNING AND CLASSIFICATION REPORT
AS RELATED TO THE PUBLIC DOMAIN LANDS

IN THE

WHITE AND NIOBRARA RIVER BASINS



SO. DAK., NEBR. & WYO.

A MISSOURI RIVER BASIN INVESTIGATION

(FOR ADMINISTRATIVE USE ONLY)

PROPERTY OF
Bureau of Land Management
DSC L13635

UNITED STATES DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

REGION III

BILLINGS, MONTANA

APRIL 1951

HD
243
.S8
L3635
1951

BLM LIBRARY
RS 150A BLDG. 50
DENVER FEDERAL CENTER
PO BOX 25047
DENVER CO 80225

11589482

80
243
138
L3635
1951

Land Planning and Classification Report
as relates to the public domain lands
in the

WHITE AND NIOBRARA RIVER BASINS

This area also covers the Ponca Creek Basin, located between
the major basins, which is included in the
Niobrara River Basin section of this report.

Nebraska, South Dakota, Wyoming

A (Missouri River Basin Investigation)

For Administrative Use Only

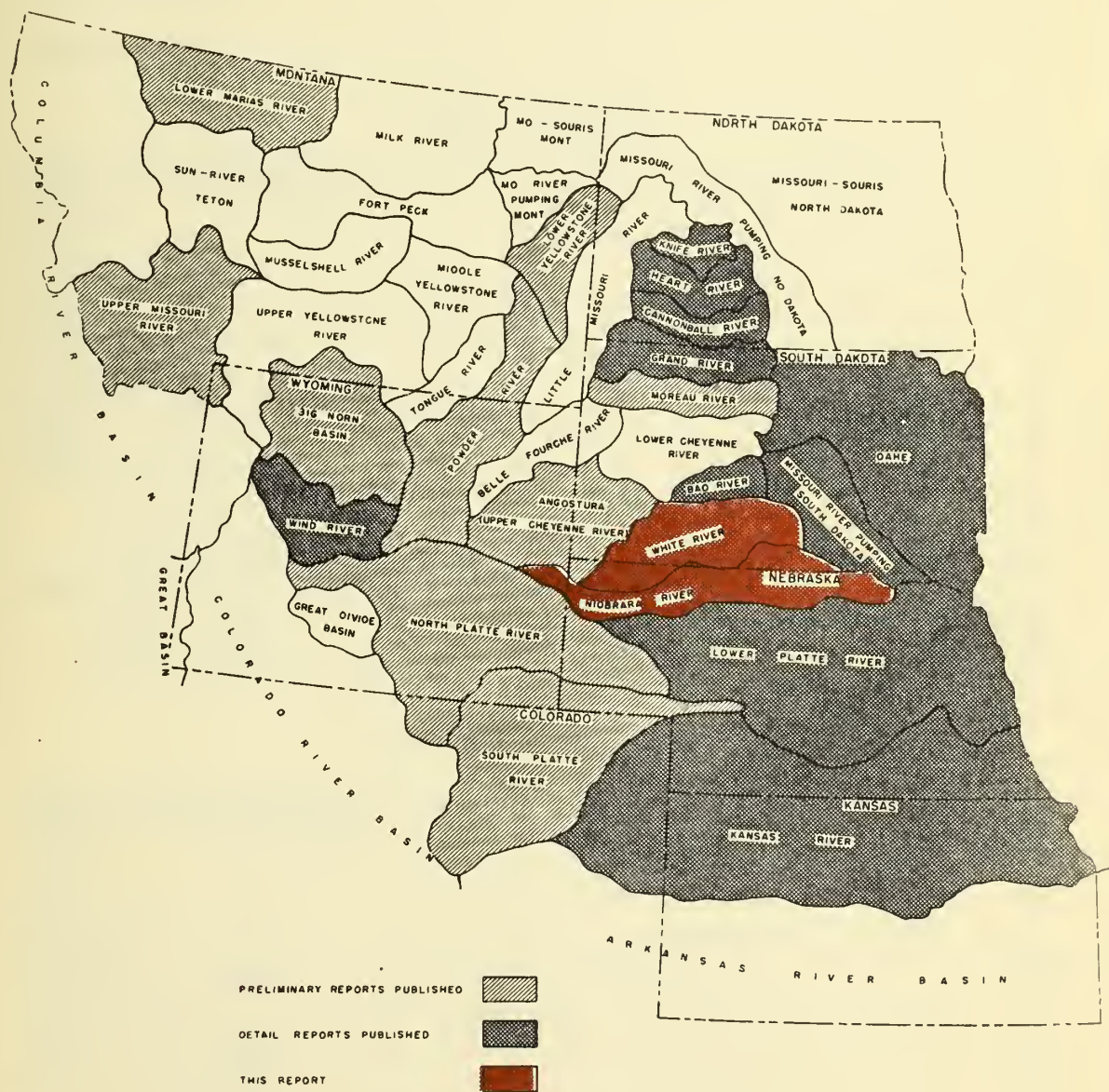
US
= DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
REGION III
BILLINGS, MONTANA

April, 1951

BLM LIBRARY
RS 150A BLDG. 50
DENVER FEDERAL CENTER
P.O. BOX 25047
DENVER, CO 80225

This study is a feature of the program of the
Department of the Interior for the development of the
resources of the Missouri River Basin.

PRESENT STATUS OF BUREAU OF LAND MANAGEMENT STUDIES IN THE MISSOURI RIVER BASIN



CONTENTS

Page No.

INDEX OF TABLES

PREFACE	I
-------------------	---

WHITE RIVER BASIN

GENERAL DESCRIPTION	1
GEOLOGY AND PHYSIOGRAPHY	1
CLIMATE	2
SOILS	3
VEGETATION	4
MINERALS	5
SETTLEMENT HISTORY	6
POPULATION	7
PUBLIC FACILITIES	8
TRADE AND INDUSTRY	9
LAND AND WATER USE	9
Agriculture	9
Irrigation and Power	10
Forest Products, Recreation, and Wildlife	10
LAND PROBLEMS AND PROPOSED ADJUSTMENTS	11
Federal Lands	11
Public Domain	12
State Reserved Lands	13

NIOBRARA RIVER BASIN

GENERAL DESCRIPTION	18
GEOLOGY AND PHYSIOGRAPHY	18
CLIMATE	19
SOILS	20
VEGETATION	21
MINERALS	22
SETTLEMENT HISTORY	22
POPULATION	23
PUBLIC FACILITIES	24
TRADE AND INDUSTRY	25
LAND AND WATER USE	25
Agriculture	25
Irrigation and Power	26
Forest Products, Wildlife, and Recreation	27
LAND PROBLEMS AND PROPOSED ADJUSTMENTS	28

WHITE AND NIOBRARA RIVER AREAS, Public Domain Map	17-18
---	-------

INDEX OF TABLES

WHITE RIVER BASIN

Page No.

Table 1 - Facilities provided by towns and cities within the White River Basin, Nebraska and South Dakota, 1951	14
Table 2 - Existing and proposed irrigation projects, White River Basin, Nebraska and South Dakota, 1951	15
Table 3 - Distribution of landownership and administration, White River Basin, Nebraska and South Dakota, 1951	16
Table 4 - Description, area, classification, and appraisal of unreserved public domain land within the White River Basin, Nebraska and South Dakota, 1951	17

NIOBRARA RIVER BASIN

Table 5 - Facilities provided by towns and cities within the Niobrara River and Ponca Creek Basins; Nebraska, South Dakota, and Wyoming, 1951	32
Table 6 - Distribution of landownership and administration, Niobrara River and Ponca Creek Basins; South Dakota, Nebraska, and Wyoming, 1951	33
Table 7 - Description, area, classification, and appraisal of unreserved public domain land within the Niobrara River and Ponca Creek Basins; Nebraska, South Dakota, and Wyoming, 1951	34
Table 8 - Description and definitions of land-use capability classes	37

PREFACE

This report concerns the public domain in three river basins within the Missouri River System: Niobrara River, Ponca Creek, and White River. These streams are the southernmost of the minor tributaries of the Missouri River. White River and Ponca Creek Basins are located in southern South Dakota and northern Nebraska. Niobrara River Basin is located in southern South Dakota, northern Nebraska, and eastern Wyoming. The location and area of the three river basins are shown on the map accompanying this report.

This report is intended for administrative use only. This study was made as a feature of the Interior Department's comprehensive resource development program for the Missouri River Basin. Purpose of the study concerning the White and Niobrara River Basins is to inventory and classify the public domain lands and their resources, and to determine the best use for this land consistent with the general public interest.

Development proposals of the Bureau of Reclamation and Bureau of Indian Affairs, and those of the Corps of Engineers, Department of the Army, have been considered relative to public domain lands. A general description of the area is given as a background for public domain land use and value. This has been given in more detail for the White River Basin because of the greater area interest of the Federal land administrative agencies in that basin. Ponca Creek Basin has been included with the Niobrara River Basin in this study. Information for the report was secured from field studies and from the tentative plans of the administrative and construction agencies concerned. Plant nomenclature conforms to Standardized Plant Names, H. P. Kelsey and W. A. Dayton, J. H. McFarland Company, Second Edition, 1942.

It is intended that the findings as set forth will lead to the proper management and development of the public land resources, either under public programs or private ownership, and will provide for their highest productive use consistent with the best public interest. Similar studies are in progress and others have been completed for other tributary drainages in the Missouri River System. Areas with field investigations under way, and those for which reports have been completed, are shown on the map at the beginning of this report.

WHITE RIVER BASIN

GENERAL DESCRIPTION

White River Basin is a fascinating area of rolling grass and farm lands with scenic badlands, wooded streams, white cliffs, Indian villages, lakes, and ponds. Here East meets West, and ranchers, farmers, and Indians mingle on the streets in towns from Bonesteel to Harrison. The old cavalry post Fort Robinson, Wounded Knee Battlefield, and the Indian agencies at Rosebud and Pine Ridge recall the old West of the buffalo, the "soddie," and the "Texas Trail Herd." Names of the French Canadian trappers are perpetuated in family names in the area. Indians still live by the hunt, but now the game is birds and rabbits instead of buffalo. Prairie farms meet and blend with the ranches of the western range, and the fringe of the corn belt merges into the grasslands of the western plains.

White River Basin extends 240 miles northeast from its source in the northwest corner of Nebraska to near Chamberlain, South Dakota. The watershed averages about 42 miles in width and contains 10,200 square miles. Elevation varies from 1,400 feet at the mouth to 5,000 feet at the source near Harrison, Nebraska. About 1,530 square miles of the basin are in Nebraska and 8,670 square miles are in South Dakota. The name of the stream is derived from the whitish sediment in its waters, which comes from the badland portion of its drainage. The base perennial flow of the stream is from springs in the sandhills, some of which have unusually large flows. Average annual runoff of White River is 369,000 acre feet. Heavy sediment contributions of the stream, due to runoff from the large area of badlands and from hilly farmlands, make a downstream problem. The Corps of Engineers has planned Reliance Dam, near the mouth of the stream, to reduce sedimentation in Fort Randall Reservoir.

GEOLOGY AND PHYSIOGRAPHY

The greater portion of the White River area lies in what is geologically named "Tertiary Tablelands." "This is a region of young rocks, Tertiary in age, which were formed of the debris made in carving the present Rocky Mountains and Black Hills. The rocks, therefore, are predominately sands and clays brought from the west by streams and blown into dunes by the wind. They are predominately light in color. Some are dazzlingly white and where there are many exposures, the traveler moves through a very white country," (State Geological Survey, A Geology of South Dakota, Part I, The Surface, E. D. Rothrock). In the southern portion of the area a number of tributaries of the White River rise at the base of the Pine Ridge Escarpment. Among these can be mentioned the Medicine Rock, White Clay, Wounded Knee, Bear-in-Lodge, and Porcupine Creeks. Between these streams there are large expanses of nearly level country broken occasionally by a butte. In the northwest corner of the area there is a region of extreme erosion that is one of the largest and most spectacular badland areas in the world. This badland area is known

as the Big or White River Badlands. It extends down the valley more than 100 miles. A large portion of this spectacular formation of gleaming rocks and colored earth has been set aside as a National Monument. The northern divide of the basin for a distance of 60 miles is a steep, formidable line of badland cliffs and ridges called the "Great Wall." This barrier can be crossed at few points. Sioux Indians of the region refer to this area as "Makoositcha," or impassable land.

A large part of the southwestern portion of the basin is in the northern edge of the sandhills. The majority of the White River Basin is rolling plains, gradually becoming more level to the east until steep slopes are encountered in the breaks of the Missouri. Along the northwestern divide of the basin there are a number of unusually large flat-topped buttes or mesas which are locally called tables. These areas of farm and grass land rise 400 feet or more above the surrounding plain, and range up to 30 square miles in area. Their cliff-like sides allow access at only a few points. Part of the southern divide on the west end of the basin is the high north-facing Pine Ridge Escarpment.

CLIMATE

The climate of the White River area is typical of that of a mid-continental area with hot summers, cold winters, low and variable rainfall, and low humidity. Temperatures range at Murdo, South Dakota, from an average of 19 degrees in January to 77 degrees in July. At Winner, South Dakota, the range is from an average 21 degrees in January to 77 degrees in July. At Chadron, Nebraska, the average range is from 24 degrees in January to 76 degrees in July. There is an average of 155 frost-free days at both Murdo and Winner, but only 146 days at Chadron, undoubtedly because of its higher elevation. Rainfall at all three locations averages approximately 18 inches annually. Highly localized thundershowers in summer are typical. The entire area has experienced alternate cycles of wet and dry years, the most recent dry period being in the thirties, while a wet cycle was prevalent during the forties. Prevailing wind direction is from the south or southeast during May to September, and from the north-northwest during the remainder of the year. Hot, dry winds and hail storms occasionally cause crop damage. There are also occasional severe winters such as that of 1948-49, during which heavy blizzards and very low temperatures occurred. Considerable hardship results during such periods.

Climatic variations affect the composition of the range, economics, cropping, land use, and population of the area. Single seasons of ample spring moisture and series of wet years promote the growth and relative amount of bluestem wheatgrass. Dry years with summer thundershowers as the source of moisture on winter-dry range favors the short grasses of the buffalo-grama group.

The dry cycle of the early thirties caused farm abandonment, virtual elimination of the livestock, emigration, and necessitated substantial relief programs in the area. Submarginal land purchase, resettlement, and subsistence programs were active in the area. The favorable economic and moisture supply years of the forties increased farming and livestock, and brought prosperity to the White River Basin.

SOILS

White River Basin soils vary from badlands to dune sands. Soils in the eastern, northern, and western parts of the basin are generally heavy types with the exception of a township of dune sand in northeastern Washington County. The sandhills of Nebraska extend into the southern portion from Shannon County to Gregory County. The dune sands of these hills border on good loam soils of the Rosebud and Holt series, which predominate in the central part of the basin in Bennett and Todd Counties. Areas of thinner soils, clay and silt loams of the Epping series are generally found on the rolling lands between the loams and the clay soils.

Badlands and badland basin soils occur along the White River from the Badlands National Monument eastward to Mellette County, where they join the undesirable gumbo of Pierre clay which covers western Mellette County. East of the basin of the Little White River or South Fork, Boyd clay extends over the balance of the basin, with small areas of Boyd and Holt loams. The Boyd clay soils are fertile soils used for farming, but they require especially favorable moisture conditions for crop or range production.

Brule clay and clay loam predominate in the Nebraska portion of the basin, extending eastward to the sandhills in Sheridan County.

Climate, surface gradient, and soil type are markedly limiting factors in proper land use within the basin. Thin soils and steep slopes should not be tilled because of their inherent erosion hazard and low productive capacity. Because of the prevalent strong winds, nearly all of the soils are subject to severe wind erosion unless protected. Clay and loam soils are moved because of the light weight of their particles; and the sandy soils and dunes are subject to wind erosion without good vegetative cover because of their lack of cohesion. During the cyclical drought years of the thirties thousands of cultivated acres in the basin were wind-eroded down to the plow sole.

Farming on the Brule soils in Nebraska causes severe erosion and stream sedimentation, which is rapidly filling the storage reservoir at White Clay. The erosion and climatic conditions of the area, spectacular in times of drought, have induced operators in the area to include virtually all of the basin in soil conservation districts. Drought

conditions in the thirties caused the purchase of large areas of sub-marginal lands in the basin, and led to the formation of land utilization districts north and west of the White River and near its source in Nebraska.

VEGETATION

Vegetative cover of the White River Basin varies markedly from the badlands areas on the north with their raw earths and rocks which are virtually lacking in soil and vegetation, to the verdant stands of tall grass on the sandhills to the south. Vegetation in the badlands is largely restricted to bottoms of the draws where some soil has formed. Plants typical of the badlands are Rocky Mountain juniper and segolilly mariposa. Shallow clay soils have developed in the more level portions of the badlands to an extent sufficient to support some blue grama and bluestem wheatgrass. The shelter and feed afforded by the badlands is highly regarded for winter use by stockmen in the area.

The northern margin of the sandhills extends into the southern portion of the White River drainage, with stabilized dunes interspersed with creeks. Dominant grass of the sandhills is prairie sandreed. Meadows on the creek bottoms are a mixture of wheatgrasses with other grasses, and they are usually cut for hay for wintering livestock. The sandhills soils blow out in patches if grazing is excessive, making it necessary to move salt and watering places frequently in this area to prevent range damage. Water is readily available by merely driving down a well with a sand point. Prairie sandreed is not palatable when cured naturally on the stalk, so it is necessary to cut and bunch it for winter feed.

The sandhill area gradually blends into the rolling plain, the soils becoming less sandy northward, being loams in the Rosebud and Holt series. Much of the land is too steep for farming, cropping becoming more general on the more level lands with loam soil in the central part, and on the clay soil in the eastern portion of the basin. On these loams and clay soils a mixture of bluestem wheatgrass, blue grama, and needleandthread grasses make up the majority of the native range cover.

The northern and western portions of the basin near the badlands are hard clay soils of the Pierre series. Dominant vegetation is blue grama with bluestem wheatgrass increasing markedly in wet years. Much of this area has sticky, fine clay soil known as gumbo. Production of grass is dependent upon a favorable supply and distribution of rainfall. These soils are fertile and yield good crops in years of favorable moisture supply, but give no production in dry years. Dry years do not reduce production so much on the more sandy soil types in the southern portion of the basin, production of grass being better in the sandhills

than on the heavier soil types in very dry years. Drainage bottom lands are alluvial soils of recent formation. On the sandhill creeks and streams they are sandy, becoming heavier where drainages intercept loams, clays, and shale parent material. Outside of the sandhills the bottoms of draws and drainageways are tree-covered. The larger streams are lined with eastern poplar. A large area of these trees occurs as a pure stand at the mouth of the South Fork of the White River. A typical northern hardwood forest composed of American elm, green ash, and bur oak border the tributary streams. Bur oak persists up the small draws, becoming short and scrubby as the heads of drainages are approached. A considerable stand of western yellow pine is found in the breaks of the South Fork of White River and a scattering stand of smaller trees of this species grows along the Pine Ridge westward.

Tree cover is utilized for fuel, fence posts, poles, lumber, and winter protection for livestock. Black chokecherry and American plum are common shrubs or low trees occurring singly or in thickets along watercourses and occasionally on the grasslands. The fruits of these plants are utilized by Indian and white inhabitants of the region. Less commonly found fruiting shrubs used for food are the buffaloberry and serviceberry. Fendler Woods rose is common throughout the area.

Range conditions within the area are generally good, especially on the larger units in the central and western portion of the area. Smaller units and pastures operated in conjunction with farming operations are frequently over-stocked and abused, the higher-producing taller grasses having been replaced by grama grass and weeds with low carrying capacity.

Favorable climatic conditions during the forties caused markedly increased production of range forage. This has led to heavy stocking of some ranges which will create critical range conditions in event of depleted production. Cyclical droughts which will occur again in the future or improper management will cause reduced range production. Proposed irrigation projects will aid in stabilization of the livestock industry in the area when they are developed and utilized.

MINERALS

Minerals are virtually lacking in the basin. Manganese occurs in nodules in the Pierre shales at the mouth of the river. Some bentonite is found in Fall River County, South Dakota.

Oil and gas drilling to date has failed to produce results. The area lacks suitable sand and gravel for construction and road ballast.

SETTLEMENT HISTORY

First settlers in the basin were the trappers and traders who operated from the Missouri River during the days of the fur trade, 1806 to 1860. Fort Randall was established on the Missouri at the southeast corner of the basin in 1856. From that time settlement of the area spread slowly prior to the official land openings and the coming of the rails. Fort Robinson was established near the Wyoming-Nebraska line in 1874 for the protection of travelers and to prevent intrusion on the Indian land. Indian wars threatened the Nebraska-Dakota frontier until the last of the hostile Sioux, under Crazy Horse, surrendered at Fort Robinson in 1877.

Approximately one-fourth of the White River Basin was subject to settlement under the Homestead Act and other land laws affecting the public domain. Most of the area was included within the boundaries of Indian reservations. Land in the area within Nebraska and north of the White River became public domain and passed into private ownership.

Settlement in the Nebraska portion of the area began soon after the Indians were located on their Dakota reservations in 1880. Sioux lands north of the White River were thrown open to settlement in 1890, but they remained open range until the Milwaukee Railroad brought in land-seekers in 1905. Gregory County was opened to settlement in 1904, and the 2,500 pieces of Indian land available were sold among a list of 106,308 applicants by lot. The price paid was \$4.00 per acre. When Tripp County was opened to settlement in 1908, the land was classified; that which was best adapted to tillage being priced at \$6.00 per acre, while the more steeply rolling lands were priced at \$4.50 and \$2.50 per acre. Six thousand homesteads were offered and distributed among a list of 114,769 registrants. Fifteen trains a day brought land-seekers to the end of the line at Dallas, South Dakota.

Indian lands were gradually offered for sale because of the Allotment Act of 1888. Quarter sections were allotted to individual Indians in an attempt to civilize them and encourage them to settle down. This amount of land was not sufficient to maintain a family nor to utilize for grazing; therefore, allotment led to rental and eventual sale of much of the Indian land in the basin. The Wheeler-Howard Act of 1934 stopped the sale of Indian land, and in recent years a land exchange plan has been put into operation on the Rosebud Reservation in order to dispose of fractional heirship interests in allotted lands and to establish economic units.

Settlement was intensified with the building of railroads because of promotion by the constructing companies and also due to the new opportunity to ship and market products. The Chicago-Northwestern Railroad entered the White River Basin at Bonesteel in 1902, reached Gregory

and Dallas in 1907, extended westward to Winner in 1911, and built on to Wood in 1929. The main line west through Chadron, Nebraska, was built in 1885. The Milwaukee Road built along the northern rim of the basin in 1907. Rails were extended westward from Chadron to Wyoming, and northward to Rapid City, South Dakota in 1885 and 1886. The Chicago, Burlington, and Quincy built its line northward through Crawford in the eighties.

POPULATION

Most of the area contained in the White River Basin is very sparsely settled, particularly the South Dakota portion. Area population in 1950 was approximately 47,100, a decrease of 13 per cent from 1940. Based on the 1950 U. S. Census, the South Dakota population within the basin is about 34,400, a decrease of 15 per cent in the last decade. Population of the Nebraska portion of the basin was about 12,700 in 1950, a decrease of 13 per cent in 10 years. Chadron, Nebraska, is the largest city in the area. The 1950 population was 4,651, an increase of nine per cent in the decade. Chadron is a prosperous trading center, a railroad division point, and the site of Nebraska State Teachers College. The country surrounding Chadron has the heaviest population concentration in the area. This can be attributed to better soil and topographic conditions, the practice of irrigation on some 10,000 acres, and to good transportation facilities. Crawford is the second largest city in the Nebraska sector, with a 1950 population of 1,806, a decrease of two per cent in ten years. Winner is the largest city in the South Dakota portion of the basin. Its 1950 population was 3,239, a growth of 34 per cent in a decade. Gregory, second-sized South Dakota community with 1,376 individuals in 1950, increased 10 per cent in the 10-year period.

Nearly all of the Indians on the Rosebud and Pine Ridge Reservations reside within the basin. There were 9,029 Ogalala Sioux on the Pine Ridge in 1945, and 6,969 Rosebud Sioux on the Rosebud in that year, or a total of 15,998 Indians, comprising about half of the population of the basin in South Dakota. The Indian population is increasing rapidly, causing serious economic and social problems for the Sioux people due to their limited resources, folkways, and adjustment handicaps. The Indians prefer to remain on the reservation where they have their own group life. Employment opportunities are limited in the area so it is necessary for them to leave for seasonal agricultural and other employment.

Population in the area increased rapidly with the coming of the railroads and with the opening of the reservations to settlement after 1900. High prices, farm mechanization, favorable climate, and land sales from 1912 to 1930 brought the population to peak numbers. Droughts led to crop failures, dust storms, and lack of grass in the thirties, forcing extensive emigration of population, forced sale of livestock, and farmland abandonment.

The tendency during the favorable price and moisture supply years of the forties was to increase rangeland use in the area, and much of the abandoned marginal farmland was never worked again. This factor, combined with the development of larger operating units by livestock operators, prevented a return of rural population. More favorable economic conditions restored the population in the towns and even led to some increase. This increase in urban population has not been sufficient to offset the diminished rural population. Total population of the area is less than it was in 1930. The 1951 trend is upward, largely due to increasing numbers of the Indian segment of the region.

PUBLIC FACILITIES

White River Basin is well provided with highways and a network of roads provided by the states, counties, Bureau of Indian Affairs, and Federal aid highway projects. Five transcontinental highways cross the area, three from east to west and two from north to south. Highway No. 18 serves the basin from Gregory westward to Oglala. Highway No. 16 skirts the northern boundary of the basin from Murdo to Scenic, and Highway No. 20 is located south of the basin, crossing the southern tip from Hay Springs to Harrison, and serving the cities of Chadron and Crawford. The north to south U. S. Highways are No. 183, through Winner, and No. 83, through Mission and White River. Both states provide six highways for the area. In the farm areas in the southern and eastern portions of the basin, a network of county roads covers nearly every section line.

Four railroads serve the basin. A branch line of the Chicago - Northwestern from Norfolk, Nebraska, terminates at Wood. The Mitchell to Rapid City line of the Milwaukee Road (Chicago, Milwaukee, St. Paul, and Pacific Railroad) parallels U. S. Highway No. 16 on the north boundary of the basin. The main line of the Chicago-Northwestern from Omaha to Casper and Lander crosses the southwestern head of the basin from Hay Springs to Harrison. The Billings-Alliance-Lincoln line of the Chicago, Burlington, and Quincy Railroad crosses the same region through Crawford. Bus lines operate on all of the transcontinental highways, as well as some of the state highways, providing passenger service for the principal towns and cities. All towns in the area are served by truck lines.

Nebraska State Teachers College at Chadron is the only school of collegiate level in the area. Twenty high schools are located in the basin. The Bureau of Indian Affairs operates boarding high schools at Pine Ridge and Mission. There are four Indian mission schools in the White River Basin. Indian elementary schools are located at Indian settlements on both the Pine Ridge and Rosebud Reservations. State system elementary schools outside of the towns are usually small, as the winter climate restricts travel. One or more elementary schools are located in most of the townships within the area.

TRADE AND INDUSTRY

Farm marketing and supply centers with grain elevators, feed mills, livestock sales rings, creameries, and railroad facilities serve the area at Gregory, Winner, Murdo, Crawford, and Chadron. Grain elevators, shipping points, and farm supplies are available at 25 railroad towns in the area. Chadron has a large flour mill, an oil refinery, a railroad roundhouse, and a metal fabricating plant. Locker plants are located in the larger towns. A meat packing plant is located at Winner. White River and Martin are interior county seat towns providing farm supplies and limited marketing facilities. Indian agencies are located at Pine Ridge and Rosebud. Facilities provided by the towns are shown in Table No. 1.

LAND AND WATER USE

Agriculture

Major land use in the area is grazing, almost exclusively by beef cattle. Most of the farm operations are either associated with grazing as production of winter feed crops, or as crop production marketed through livestock on farms in the eastern portion of the basin. Cash crops are usually restricted to surplus grain, produced above operators' feed needs. Periods of high grain prices induce large scale plantings for a cash crop in the area, often on land better suited to grass, with a consequent revegetation problem.

Settlement of the basin and allotment of the Indian lands, with sale of the Indian lands for a few dollars per acre, led to increasing tillage in the area after 1900. Sales, land allotment, and settlement were originally based on quarter section units. Physical and economic conditions have forced the formation of much larger operating units at the present time. Farms in the eastern section average over a section in area, and the size increases as cattle and grazing make up a larger portion of the operation of a unit.

Crops in the area are restricted to those which mature before the usual summer drought period or those which can exist through it and mature on the fall moisture. Small grains raised include wheat, oats, barley, and rye. Oats are grown on a large scale because they are preferred for hay if conditions do not appear good for a grain crop. Rye is grown for a winter cover and pasture crop. Barley is favored as a grain feed crop because of its high yield. Wheat is usually grown only as a cash crop. Corn is the leading row crop. Cane and sudan grass are grown for winter stock feed. Grain sorghums, alfalfa, millet, and native hay are also important crops. Irrigated lands in the basin are used for the production of livestock feed, principally alfalfa and small grains. Sugar beets have been produced on the Whitney project in Nebraska. Vegetables for sale and subsistence are leading crops on the smaller irrigation projects scattered over the two Indian reservations.

Potatoes for seed are produced on dry-farmed lands over an area centering at Crawford. The Nebraska portion of the basin is largely utilized for farms producing livestock, principally beef, from pasture, small grains, and corn. In this area, and in the eastern portion of the basin, production of hogs, poultry, and dairy products are important enterprises.

Most of the cattle produced in the area are sold as feeders to corn belt operators. Many of the established range operators in the basin sell their steers to the same feeder year after year. Active local markets are provided by the auction sale rings in and adjacent to the area. Many ranchers in the area market their stock in Sioux City, Iowa. Trucking is the favored method of shipping. Surplus grain is usually sold to the local elevator companies.

Irrigation and Power

Waters of the White River have been used for irrigation and power development for several years. Irrigation developments range from two private gardens of a few acres each, provided with water wheels, up to the 10,000-acre Whitney project in Nebraska. A hydroelectric plant at White River on the South Fork utilizes that stream for power generation with a capacity of 270 kilowatts.

Unfavorable climatic and economic conditions of the thirties seriously affected the Indian populations and lands on the White River reservations and caused the development of 67 irrigation projects totaling 3,690 acres in the basin. Four of these projects were large gravity systems, the balance being small pumping units largely for subsistence gardeners. The Bureau of Indian Affairs and the Bureau of Reclamation have proposed the construction of four storage projects in the basin to irrigate 55,800 acres, including 11,600 acres by gravity and 44,200 acres by pumping below the storages. Details of location, water source and area served of the proposed projects and larger existing projects are shown in Table No. 2.

Forest Products, Recreation, and Wildlife

Hardwood forests along the streams furnish posts and poles for ranch and farm use. Bur oak is the most important of the trees used for this purpose, elm and ash also being used. Cottonwoods and the larger hardwood trees are suitable for limited local lumber use, but they are not utilized. Lumber production is confined to a small cut from yellow pine on the tribal timber reserves of the Rosebud Reservation. All types of trees are very valuable for fuel, especially for the Indians, as they cannot afford to purchase oil, coal, or gas. Forests and thickets within the area provide wild plums, chokecherries,

buffaloberries, and serviceberries, which have been important food sources for the Indians for centuries.

Leading wildlife resources and recreation of the area are provided by pheasants and pond fishing. In the eastern part of the area, especially around Winner, conditions are ideal for pheasants. Areas along the streams provide water and shelter for the pheasants and the farms furnish their food. Numerous small lakes and ponds constructed during the relief period of the thirties provide fishing for bass, crappie, sunfish, perch, catfish, and bullheads. Larger lakes are Bead's Lake, Rosebud Lake, White Clay Lake, Oglala Lake, Whitney Lake, Corn Creek Lake, and Denby Lake. The lakes and ponds also provide swimming and boating in the summer and are used for skating in the winter. Stream fishing is relatively unimportant in most of the area, except in the Nebraska portion, where an important trout fishery has been developed on the White River and its tributaries.

Deer provide a limited amount of hunting in the western part of the area. Trapping fur animals is an important economic activity in the area, especially for some of the Indians. Principal among the animals trapped are skunk, beaver, mink, and muskrats. Ponds, lakes, and streams provide a limited amount of duck shooting. Hunting provides much of the meat consumed by the local Indians. They utilize rabbits, pheasants, ducks, grouse, and other birds; skunk, beaver, and deer. Sioux Indians fish very little. They could materially add to their limited food supply by the fishery at present available in the area.

LAND PROBLEMS AND PROPOSED ADJUSTMENTS

Federal Lands

Pine Ridge and Rosebud Indian Reservations include nearly all of the South Dakota portion of the basin. Both reservations have been allotted and opened to settlement, with some land retained in tribal ownership and with considerable areas sold into private ownership. Areas of Indian trust land, other types of Federal land, and other land-ownerships are summarized in Table No. 3.

Badlands National Monument, administered by the National Park Service, comprises about 69,000 acres in the basin. LaCreek National Wildlife Refuge, administered by the Fish and Wildlife Service, is a migratory waterfowl refuge in Bennett County, South Dakota, covering an area of 9,442 acres.

Pine Ridge Aerial Gunnery Range of the Department of Defense, covers an area of 241,344 acres in northern Washington County and northwestern Washabaugh County in South Dakota. Fort Robinson Military Reservation covers 20,401 acres in Nebraska and is now administered by the Department of Agriculture in cooperation with the University of Nebraska.

South Dakota Land Utilization Project No. 1 has been organized to include portions of Jackson, Pennington, and Fall River Counties in South Dakota. The White River Basin area of this project includes 205,279 acres of repurchased Title III land, and in addition there are 19,366 acres of public domain land which was turned over to the project for supervision. In Nebraska, Land Utilization Project No. 1, located in Sioux and Dawes Counties, has been organized. This is in two separate sections: The Pine Ridge District, containing 37,140 acres and the Sugar Loaf District, containing 94,918 acres. To this project 640 acres of public domain were transferred. The Soil Conservation Service, in conjunction with the supervisors of the two soil conservation districts of the same name, maintain supervision of this project. It should be pointed out that the Pine Ridge section is astride the White River-Niobrara River Divide, virtually all of it being in the watershed of the White River.

In South Dakota the Cane Creek and the White River Cooperative Grazing Districts have been organized to administer the use of the project lands in cooperation with the Soil Conservation Service. In Nebraska, however, grazing of the district is administered directly by the local Soil Conservation Service office at Chadron. Through the election of a board of directors these grazing associations determine grazing policies, act upon applications of qualified members to graze the land within the project, determine the acreage, rate of stocking, length of grazing period, the charges for such grazing, type and location of range improvements to be made, and other matters.

Public Domain

Public domain land in the White River Basin totals 1,959 acres of unreserved lands. There are also 20,006 acres of public domain lands within land utilization districts which have been turned over to the Department of Agriculture for administration. Seventeen tracts of unreserved public domain are located in South Dakota. All are in Jackson County, and their total area is 1,451 acres. Ten tracts are located in the Nebraska portion of the drainage with an area of 508 acres. Tracts range in size from .14 acres to 355.83 acres. Details of the character, classification, area, and value of the unreserved public domain lands in the area are shown in Table No. 4. Distribution and location of the unreserved public domain lands are shown on the map accompanying this report.

Apparently the developments proposed by Government agencies do not affect any of the remaining unreserved public domain. All state and Federal land administrative agencies active in the area will be contacted relative to their possible interest in each tract prior to scheduling for public sale. It appears that many of the tracts would be more

efficiently utilized in private ownership as they are completely surrounded by privately-owned land which is often under a single owner. Due to their scattered pattern and small size, it is difficult to administer these lands efficiently. Watershed and erosion problems are minor and would not change appreciably with a change of ownership.

State Reserved Lands

Chadron State Park consists of 720 acres and is located a short distance southwest of the town of Chadron, Nebraska. Just outside Crawford, Nebraska, is the old Fort Robinson Military Reservation. After the close of World War II, this area was declared surplus and transferred for joint administration to the Department of Agriculture and the Agricultural Experiment Station of the University of Nebraska for experimental work on range cattle. The Nebraska Game, Forestation, and Parks Commission maintains the Peterson Deer Refuge, a 1,120-acre tract 15 miles east of Harrison in Sioux County; and the Metcalfe Refuge, a 1,243-acre tract 12 miles northeast of Hay Springs in Sheridan County.

Table 1.- Facilities provided by towns and cities within the
White River Basin, Nebraska and South Dakota, 1951 1/

Cities and Towns	Grade Sch.	High Sch.	Church	Hospital	Food Store	Hardware	Clothing	Feed Deal.	Machinery	Lumber Yd.	Fuel Plant	Elevator	Sales Ring	Creamery	Poultry	Cream Sta.	Theatre	Lodges	Other Rec.	Highways	RR Siding	RR Depot	Truck Line	Garage	Park	Hotel	Restaurant	Population	
South Dakota																													
Batesland	X		X		X			X												U 13			X	X			X	300	
Belvidere	X	X	X		X	X		X	X	X	X	X			X	X		X		U 16	X	X	X	X	X	X	X	128	
Bonesteel	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	U 18	X	X	X	X	X	X	X	532	
Burke	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	U 18	X	X	X	X	X	X	X	602	
Carter	X		X		X				X						X	X				U 18			X	X				42	
Colome	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	U 18	X	X	X	X	X	X	X	509	
Dallas	X	X	X		X	X	X	X	X	X	X	X			X	X	X	X		U 18	X	X	X	X		X	X	278	
Gregory	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	U 18 S 47	X	X	X	X	X	X	X	X	1,246
Herrick	X		X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	U 18	X	X	X	X	X	X	X	245	
Kadoka	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	U 16	X	X	X	X	X	X	X	464	
Martin	X	X	X	X	X	X	X	X	X	X					X	X	X	X	X	U 18			X	X	X	X	X	1,013	
Mission	X	BIA			X			X							X	X	X	X		U 18 U 83			X	X		X	X	452	
Murdo	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	U 16 U 83	X	X	X	X	X	X	X	X	680
Norris	X		X		X										X	X				S 40								90	
Okreek	X		X		X										X	X				U 18			X					335	
Parmalee	X		X		X	X			X						X	X				BIA			X	X			X	245	
Pine Ridge	X	BIA	X	BIA	X			X									X		X	U 18 BIA			X	X	BIA	X	X	618	
Rosebud	X		X	BIA	X															BIA				X	BIA		X	120	
Saint Charles	X		X		X	X		X				X								U 18		X	X	X				100	
Saint Francis	X	X	X		X												X			BIA			X	X			X	273	
Wanblee	X		X		X															BIA							X	300	
White River	X	X	X	X	X	X	X	X	X	X					X	X	X	X	X	U 83 S 40			X	X		X	X	562	
Winner	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	U 18	X	X	X	X	X	X	X	2,426	
Wood	X	X	X		X	X	X	X		X	X	X			X	X		X	X	S 40	X		X	X		X	X	414	
Nebraska																													
Chadron	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	U 20 S 19	X	X	X	X	X	X	X	X	4,262
Crawford	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	U 20 S 2	X	X	X	X	X	X	X	X	1,845
Harrison	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	U 20 S 29	X	X	X	X	X	X	X	X	500

1/ S - State Highway number
U - United States Highway number
BIA - Bureau of Indian Affairs road

Table 2.- Existing and proposed irrigation projects, White River Basin, Nebraska and South Dakota, 1951 1/

Project	Location			Source of Irrigation Water	Irrigated Area (Acres)	Ultimate Area (Acres)	Type of Project	Sponsor
	Town	County	State					
<u>Existing Projects</u>								
He Dog	Parmalee	Todd	S. D.	Cutmeat Creek	30	450	Gravity-Storage	BIA
Oglala	Oglala	Shannon	S. D.	White Clay Creek	800	1,500	Gravity-Storage	BIA
Two Kettle	Westover	Mellette	S. D.	Little White River	300	1,000	Gravity	EIA
White Clay	Pine Ridge	Shannon	S. D.	White Clay Creek	200	350	Gravity	EIA
Whitney	Whitney	Dawes	Nebr.	White River	10,000	12,500	Gravity-Storage	Pvt.
Small Indian Pumping		all in basin	S. D.	White River & Tributaries	1,280	2,360	Pumping	EIA
Private Pumping		all in basin	S. D. & Nebr.	White River & Tributaries	1,000	2,600	Pumping	Pvt.
<u>Total Existing Projects</u>					13,610	20,760		
<u>Proposed Projects</u>								
Bear-in-Lodge	Hisel	Washabaugh	S. D.	Bear-in-Lodge Creek		1,100	Gravity-Storage	BIA
Slim Butte-State Line	Slim Butte	Shannon	S. D.	White River		9,000	Gravity-Storage	BR & BIA
Weta	Weta	Jackson	S. D.	White River		42,000	Storage-Pump.	BR
White River	White River	Mellette	S. D.	Little White River		1,500	Gravity	BR & BIA
						2,200	Pumping}	
<u>Total Proposed Projects</u>						55,800		
<u>Grand Total</u>					13,610	76,560		

1/ Data from the Bureau of Indian Affairs (BIA) and the Bureau of Reclamation (BR). The area of private (Pvt.) minor areas has been estimated from the best information available.

Table 3.- Distribution of landownership and administration, White River Basin,
Nebraska and South Dakota, 1951

Ownership and Administration	Acreage	Total Acreage
<u>DEPARTMENT OF THE INTERIOR</u>		
Bureau of Indian Affairs		
Tribal and Allotted Trust Land	2,621,906	
Federal Reserves	13,317	
Purchased Title III Land 1/	67,223	
Total		2,702,446
National Park Service		
Badlands National Monument		69,000
Fish and Wildlife Service		
LaCreek National Wildlife Refuge		9,442
Bureau of Land Management		
Public Domain	1,959	
Public Domain within Land Utilization Districts 2/	20,006	
Total		21,965
Total, Department of the Interior Lands		2,802,853
<u>DEPARTMENT OF AGRICULTURE</u>		
Soil Conservation Service		
Land Utilization Projects	337,337	
Fort Robinson Military Reservation 3/	20,401	
Total		357,738
<u>DEPARTMENT OF DEFENSE</u>		
Fine Ridge Aerial Gunnery Range		241,344
Total, Federal Lands		3,401,935
<u>PRIVATE AND STATE</u>		
Nebraska State Parks and Refuges	3,033	
Private and State Lands	3,122,982	
<u>GROSS AREA, WHITE RIVER BASIN</u>		6,523,000

- 1/ Ownership of this submarginal purchased land is with the Department of Agriculture. Administration of these scattered tracts on Indian reservations has been assigned to the Bureau of Indian Affairs.
- 2/ Public domain within the Land Utilization Districts, Nebraska No. 1 and South Dakota No. 1, is administered by the Soil Conservation Service of the Department of Agriculture.
- 3/ Fort Robinson Military Reservation and wood and timber reserve is no longer used by the Department of Defense. It is administered jointly by the Department of Agriculture and the University of Nebraska College of Agriculture Experiment Station for range and beef cattle experimental work.

Table 4.- Description, area, classification, and appraisal of unreserved public domain land within the White River Basin, 1951

Black Hills Meridian, South Dakota

County	Twp.	Rge.	Sec.	Subdivision	Acreage	Present Land Use	General Land Character	Land Capability (acres) Class VII 1/	Principal Suitability	Proposed Management	Total Appraised Value
Jackson	2 S.	23 E.	31	Lot 3	36.69	Grazing	Rolling	36.69	Grazing	Private	\$ 128.20
	2 S.	24 E.	33	S $\frac{1}{2}$ SE $\frac{1}{4}$	80.00	Grazing	Rolling	80.00	Grazing	Private	240.00
	2 S.	25 E.	25	S $\frac{1}{2}$ SE $\frac{1}{4}$	80.00	Grazing	Rolling	80.00	Grazing	Private	400.00
			21	NE $\frac{1}{4}$ SE $\frac{1}{4}$, W $\frac{1}{2}$ SE $\frac{1}{4}$, E $\frac{1}{2}$ SW $\frac{1}{4}$, SW $\frac{1}{4}$ SW $\frac{1}{4}$	280.00	Grazing	Rolling	280.00	Grazing	Private	1,400.00
	3 S.	22 E.	28	NW $\frac{1}{4}$ NW $\frac{1}{4}$							
			12	E $\frac{1}{2}$ NE $\frac{1}{4}$	80.00	Grazing	Rolling	80.00	Grazing	Private	240.00
			17	SW $\frac{1}{4}$ NW $\frac{1}{4}$	40.00	Grazing	Rolling	40.00	Grazing	Private	200.00
			29	NW $\frac{1}{4}$ NW $\frac{1}{4}$	40.00	Grazing	Rolling	40.00	Grazing	Private	200.00
	3 S.	23 E.	2	SE $\frac{1}{4}$ SW $\frac{1}{4}$	40.00	Grazing	Rolling	40.00	Grazing	Private	120.00
			3	SE $\frac{1}{4}$ SE $\frac{1}{4}$	40.00	Grazing	Rolling	40.00	Grazing	Private	120.00
			9	Lot 5	18.10	Grazing	Level	18.10	Grazing	Private	36.20
			12	SE $\frac{1}{4}$, SE $\frac{1}{4}$ SW $\frac{1}{4}$							
			13	NE $\frac{1}{4}$ NE $\frac{1}{4}$							
	3 S.	24 E.	7	Lots 3 and 4	355.83	Grazing	Rolling	355.83	Grazing	Private	1,779.15
	3 S.	24 E.	18	Lot 1							
Sixth Principal Meridian, Nebraska			7	E $\frac{1}{2}$ NW $\frac{1}{4}$	80.00	Grazing	Rolling	80.00	Grazing	Private	400.00
			7	E $\frac{1}{2}$ NE $\frac{1}{4}$	80.00	Grazing	Rolling	80.00	Grazing	Private	400.00
			7	SW $\frac{1}{4}$ SE $\frac{1}{4}$	40.00	Grazing	Rolling	40.00	Grazing	Private	200.00
			8	NW $\frac{1}{4}$ SW $\frac{1}{4}$	40.00	Grazing	Rolling	40.00	Grazing	Private	200.00
	3 S.	28 E.	7	SE $\frac{1}{4}$ SW $\frac{1}{4}$	40.00	Grazing	Rolling	40.00	Grazing	Private	200.00
	3 S.	20 E.	21	N $\frac{1}{2}$ SE $\frac{1}{4}$	80.00	Grazing	Rolling	80.00	Grazing	Private	320.00
Sioux	32 N.	53 W.	29	Lot 7							
			32	Lot 2							
	33 N.	46 W.	19	NE $\frac{1}{4}$ SW $\frac{1}{4}$	0.14	Grazing	Rough	0.14	Grazing	Private	.42
			30	NE $\frac{1}{4}$ NW $\frac{1}{4}$	40.00	Grazing	Rough	40.00	Grazing	Private	160.00
			31	Lot 2	40.15	Grazing	Rough	40.15	Grazing	Private	160.60
	34 N.	46 W.	7	SE $\frac{1}{4}$ NW $\frac{1}{4}$, E $\frac{1}{2}$ SW $\frac{1}{4}$	120.00	Grazing	Rolling	120.00	Grazing	Private	480.00
	35 N.	41 W.	35	SW $\frac{1}{4}$ NE $\frac{1}{4}$	40.00	Grazing	Rolling	40.00	Grazing	Private	120.00
	35 N.	45 W.	32	Lot 1	27.75	Grazing	Rolling	27.75	Grazing	Private	97.12
	35 N.	47 W.	26	E $\frac{1}{2}$ SE $\frac{1}{4}$	120.00	Grazing	Rolling	120.00	Grazing	Private	540.00
	35 N.	47 W.	35	NE $\frac{1}{4}$ NE $\frac{1}{4}$	40.00	Grazing	Rolling	40.00	Grazing	Private	200.00
Daves	35 N.	50 W.	35	SE $\frac{1}{4}$ SE $\frac{1}{4}$	40.00	Grazing	Rolling	40.00	Grazing	Private	160.00
	35 N.	50 W.	31	SW $\frac{1}{4}$ NE $\frac{1}{4}$							
TOTAL					1,958.66			1,958.66			\$8,661.69

1/ See table A for description of classification.

NI O B R A R A R I V E R B A S I N

GENERAL DESCRIPTION

Niobrara River is the largest of the minor western tributaries of the Missouri River. Commencing at the divide west of Lusk, in eastern Wyoming, it wanders through some of Wyoming's best dry farm land in the vicinity of Lusk. Leaving Wyoming, the river soon reaches the sandhills of Nebraska, which it traverses in a canyon across the northern portion of that state to Niobrara. Some tributaries originate in South Dakota, the largest there being Minnechaduza Creek and Keya Paha River. The sandhills feed the stream from springs, and it swells in size, especially after it is joined by Snake and Minnechaduza Creeks near Valentine.

Niobrara River Basin is an area of 13,000 square miles extending from the divide west of Lusk, Wyoming, to Niobrara, Nebraska. The area encompasses 584 square miles in Wyoming, 1,150 square miles in South Dakota, and 11,266 square miles in Nebraska. Ponca Creek Basin, intervening between the Niobrara and White Rivers, has been included in the report area. Extending 80 miles eastward from Colome, South Dakota, to Verdel, Nebraska, the Ponca Creek Basin has an average width of 10 miles. Ponca Creek Basin covers an area of 391 square miles in South Dakota and 241 square miles in Nebraska. Location of the area is depicted on the cover. Drainage, culture, and land status are shown on the map accompanying this report.

Principal features of the Niobrara River Basin are its large area of undulating sandhills with a verdant cover of tall grass, the canyons and breaks of the river and some of its tributaries, and the nation's only planted National Forest. This forest was developed on the plains from grassland by planting seedling pines. Some of the sandhill lake areas are extensive wildlife refuges, while others are good waterfowl shooting grounds. Cool waters and canyon streams provide a natural habitat for trout and the rough country, with its tree and brush cover in the breaks, provides a habitat for deer.

Most of the basin is used for range or native hay. Suitable farm lands are limited and scattered, with the exception of concentrations of good tillable land in Wyoming and near some of the Nebraska cities. Drainages of the tributary Keya Paha River and of Ponca Creek contain considerable land suitable for farming in both Nebraska and South Dakota.

GEOLOGY AND PHYSIOGRAPHY

Nearly all of the Niobrara River Basin is located in the high plains section of the Great Plains physiographic province. The underlying rocks are sandstones and shales of Tertiary formations. Most of the surface is covered with wind deposits of sand of Quaternary origin. Canyons of the river and its tributaries have walls and cliffs of sandstone and chalk rock in parts of the area. Sandstone occurs as a cap rock at several points in the northern and western portion of the basin.

Principal feature of the area is the sandhills which occupy most of the drainage in Nebraska. This vast area gets its name from its chief and almost universal soil type and its monotonous succession of sand dunes with intervening pockets, small draws, and occasional valleys and grassy meadows. The sandhill area is covered with mixed native grasses and, under normal moisture conditions, there is a minimum of soil erosion. In the west portion of the Niobrara Basin, the sandhills merge into the typical northern Great Plains. This area is characterized by wide, rolling, low hills, broken frequently, particularly near the Wyoming boundary, by rock outcroppings and rimrock. Again in the northeastern portion of this area, the rolling sandhills merge into nearly level land.

The rough topography of the Niobrara River and its tributaries covers a majority of the basin. Elevations range from 1,220 feet at the mouth of the Niobrara River to over 5,300 feet at the source in eastern Wyoming. At a number of locations along their courses, the Niobrara River and its largest tributary, Snake Creek, flow through canyons several hundred feet deep. Over nearly all of its course the canyon or valley floor of the Niobrara River is so narrow or rough that roads do not follow it, but are located some distance from the stream. Certain areas, particularly in Cherry and Sheridan Counties, contain numerous small, shallow lakes. The Niobrara River has a remarkably uniform basic flow considering the small amount and wide variation of precipitation in the area. This stream and some of its principal tributaries; Keya Paha River, Snake, Minnehaduzza, and Long Pine Creeks, derive their permanent flow from sandhill springs. Flow of the Niobrara River at Spencer, Nebraska, 38 miles upstream, has varied from 5 to 21,500 second feed, with an average of 1,261 second feet. The average annual discharge is 961,000 acre feet. The Niobrara is 431 miles in length. Ponca Creek is estimated to be 120 miles in length with an approximate average annual runoff of 3,600 acre feet. Discharge of this stream is estimated to have varied from 0 to 9,000 second feet.

CLIMATE

The climate of Nebraska is characterized by "rather light rainfall, low humidity, hot summers, severe winters, great variations in temperature and rainfall from year to year, and frequent changes in weather from day to day or week to week," (U. S. Department of Commerce, Climate of the States - Nebraska, 1941). Average January temperatures from local stations in the Niobrara Basin have ranged from 20 to 24 degrees, while those for July range from 70 to 75 degrees. Extreme temperatures have ranged from a low of 40 degrees below zero to 114 degrees above.

Average precipitation for the area is about 20 inches. This varies from 16 inches in the west portion to 24 inches for the east. The limited rainfall is highly effective for forage production on the sandy soils prevalent in the area.

Climatic conditions are presented in some detail in the White River section of this report. Virtually the same climatic conditions extend over the two basins.

SOILS

Soil in the sandhill section is a fine to medium textured sand termed dune sand and Valentine sand in the series classification of the Department of Agriculture. Sandhills and sandy soils cover most of the basin in Sheridan, Cherry, Brown, and Rock Counties in Nebraska, and also in the Dakota portion of the Niobrara Basin. This sand originates from wind-blown material released by disintegration of Tertiary sandstones. Sandhill soil is uniform in texture and there is no pronounced difference in its light grayish-brown color from the surface downward. Rainfall is quickly absorbed by this soil. It is suitable for the production of grass and hay. If the grass cover is broken, extreme soil disturbances called "blowouts" will result because of the frequent high winds which prevail in this part of the country. Straw, hay, and manure are used to cover denuded areas to prevent blowouts. These materials are also used on roads in the sandhills to enable vehicles to travel over the sand.

West of the sandhills the soil changes to dark brown sandy or silt loam types which are known as the Rosebud-Bridgeport series. This soil originated from the calcareous sandstones and shales of the Tertiary age. In all the better situated locations, where this soil type predominates, the land is under cultivation. Otherwise it is generally used for pasture and hay production. In the northeastern part of the Niobrara area, both in Nebraska and South Dakota, are found some silty soils with a high lime content. This soil is termed Moody and its origin is calcareous loess of the Peorian age. This type, which extends into the corn belt, is highly productive. It is, however, highly susceptible to both wind and water erosion. The eastern portion of the basin is a mixture of a wide variety of soils, slopes, and land use, ranging from fertile farms to rough hills.

Rough topography and sandy soils suitable only for grazing or hay cover the bulk of the basin. Soils suitable for farming are generally limited in size and widely scattered. Fairly large blocks of land suitable for farming occur in the Wyoming sector of the basin, and in Nebraska north of Ainsworth, on Mirage Flats south of Hay Springs, and near Hemingford. Concentrations of suitable farmland smaller in size are located near some of the other cities in the area.

Erosion is a serious problem in the area. Wind erosion is especially severe on the sandy soils. The dunes of the sandhills were formed by wind action and they will become active if their stabilizing grass cover is seriously depleted. Sheet and gully erosion are also active in the area because of soil vulnerability, slopes, and farming and grazing practices.

VEGETATION

Tall, verdant grass is the typical sandhill cover dominating the Niobrara River Basin. Principal grass of the sandhills is prairie sandreed, better known in Nebraska as sand grass. This vigorous species is found all over the region, usually in association with sandy soil, and especially on wind-blown sand. This tall, coarse grass with curling leaves and vigorously spreading rootstalks has virtually stabilized the sandhills. When it has been established long enough to create considerable humus in the soil, other grasses begin to come in with it.

Sand bluestem is a tall, coarse rhizomatous, blue-colored grass preferring dune sand as a habitat. This species is second only to prairie sandreed in importance. Both of these grasses are only fair forage and it is necessary for cattle to consume large quantities of these grasses to gain weight. They will not be eaten if other finer grasses are available. Sandhill cattle usually have large paunches because they consume so much coarse feed. It is necessary to cut these grasses for winter feed before they seed, as they are very harsh and unpalatable cured on the stalk. It is common practice in the sandhills to mow and windrow the grass for winter feed. The better grass in the meadows is cut for hay and stacked.

Other grasses common in the western portion of the sandhills are hairy grama, blue grama, sand dropseed, needleandthread, and prairie junegrass. Less common are black grama and sand lovegrass. In the eastern portion, big and little bluestem are found and porcupinegrass replaces needleandthread.

A different type of grass cover grows on the hard soils of the basin outside of the sandhills. On the heavy soil types the vegetative cover may be a short grass of the buffalo-grama type in the west, or more usually a mid-grass dominated by bluestem wheatgrass, with buffalo-grass, blue grama, needleandthread, sideoats grama, hairy grama, thread-leaf sedge, prairie junegrass, and Indian ricegrass in the association. In the eastern part of the basin big and little bluestem dominate on the dry prairies, providing excellent hay and forage if properly managed. Bluestem wheatgrass is frequently cut for hay on favorable sites. Native hay is the principal crop of the Niobrara River Basin. Much of this is

cut from the moist meadows and creek bottoms of the sandhills and adjacent areas. Frequently these meadows have been seeded with a resulting mixture of native and cultivated grasses and legumes. Native meadow grasses are prairie cordgrass, switchgrass, yellow Indiangrass, and Canada wildrye. Other native grasses are frequently found in meadows, especially bluestem wheatgrass, prairie sandreed, and big bluestem.

Breaks of the streams are frequently covered with trees. Stands are usually sparse and are mostly western yellow pine with some Rocky Mountain juniper and bur oak. Eastern poplar (cottonwood), green ash, American elm, and willows are found along some stream bottoms, but streams are frequently treeless, especially in the sandhills.

Condition of the range is good in nearly all of the area. Overstocking or abuse produces blowouts and ruins the range in the sandhills. This necessity for protecting the grass cover virtually assures reasonably good management of sandhill ranges. A considerable percentage of the area has long been utilized for the production of wild hay in conjunction with grazing, including aftermath grazing and the winter feeding of livestock. Most of the hay land is carefully managed for good production as a result of long experience in the enterprise.

MINERALS

There are virtually no mineral developments in the Niobrara area. There has been some drilling for oil in the western part of the area. No oil or gas has been discovered up to the present time. Sand is dredged from the river at Long Pine and shipped extensively for use in construction work. Chalk rock is used for a building stone and is crushed for road ballast. While it is soft and not very durable for road ballast, it is the only local material available in parts of the area and has considerable use. Sandstone is also used for these purposes at points in the basin.

Many of the shallow lakes located in western Nebraska within the basin contain potash, both as a brine and in layers beneath the waters of the lake. Potash was produced commercially from some of these lakes during World War I, when the normal German source was cut off. They were not used in World War II because better deposits of mineral potash were discovered elsewhere in the United States.

SETTLEMENT HISTORY

The Niobrara River Basin was both a pathway and a boundary of settlement of the West. First settlement of the basin by white men was at Niobrara, Nebraska, in 1856. Settlers at first were simply squatters making deals with the Indians for 320 acres or more, protecting their claim by organizing "claim clubs" to record their rights. Early

settlement developed slowly. Indians, trappers, and hunters were the sole inhabitants of virtually all of the area prior to 1870.

Cattlemen with trail herds from Texas were the first to settle in the western part of the basin. About 1870 they began to graze their cattle on the open range during the summers. Later they wintered their cattle in the area and established ranches. Fort Robinson was established in 1874, near the Wyoming-Nebraska line, to protect travelers from Indian raids and to prevent invasion of the Indian territory by settlers. Fort Niobrara was established at Valentine, Nebraska, in 1880 for the protection of settlers and travelers. Establishment of this fort encouraged farmers to enter the area and they began to spread westward in the basin.

The surrender of Crazy Horse, last of the hostile Sioux, at Fort Robinson in 1877, marked the end of the Indian wars on the Nebraska-Dakota frontier. The basin gradually opened to more settlement as the Indians were placed on reservations in South Dakota and Oklahoma. Gradual extension of the Chicago-Northwestern Railroad, then known as the Fremont, Elkhorn, and Missouri Valley Railroad, westward across the basin from 1881 to 1886, provided for active settlement of the area. The Chicago, Burlington, and Quincy Railroad was built across the western portion of the basin from Hemingford to Crawford, Nebraska, in 1885. In 1895, this road built a branch line into O'Neill, Nebraska.

During this period of settlement, three land laws enabled the pioneer to acquire 480 acres of land; the Homestead Act of 1862, the Timber Claim Act of 1873, and the Preemption Acts which allowed settlers to purchase land at \$1.25 per acre. Settlement of the sandhills was speeded by the passage of the Kinkaid Act in 1904, providing for homesteads up to 640 acres in size. The Dakota-Nebraska line was a boundary of white settlement prior to 1900, as land could not then be acquired on the Indian reservations in South Dakota.

POPULATION

Niobrara River Basin is a sparsely-populated region. Population is concentrated on the better farmlands and in the towns and cities, few persons residing on the sandhill ranches. Rural population has decreased markedly in the last 10 years and the urban population has increased. Farm and ranch mechanization, high labor costs, increasing size of grazing operating units, and the development of larger farm units better suited to the mechanization and current agricultural economic pattern have all contributed to decreasing population on the farms and ranches. Increased demand for machinery, repairs, feed, supplies, materials, fuel, and services by farmers and ranchers have caused the towns and cities to grow.

High returns for farm and ranch products have materially increased living standards and the expenditures of ranchers and farmers in the region. Much of this wealth is expended in the towns and cities of the area. Growth of the towns and cities has not been sufficient to compensate for rural population loss in the last 10 years, the gross population showing a decrease of 17 per cent.

Population of Niobrara River Basin in 1950 was approximately 46,700, with the majority residing in towns and cities in the area. Sheridan County lost less population in the decade than any other in the basin, the amount being three and one-half per cent. Two factors were largely responsible: the presence of three cities, Gordon, Hay Springs, and Rushville, each of which increased in population; and the development of the Mirage Flats Irrigation Project. The rural county of Keya Paha suffered the largest population loss, 33 per cent since 1940. Hay Springs increased more rapidly than any other community, the rate being $32\frac{1}{2}$ per cent. This increase was due to the development of the Mirage Flats Project, as Hay Springs is the shipping point and trading center for the project. Largest city in the area is O'Neill, with a 1950 population of 3,050, a decade increase of $20\frac{1}{2}$ per cent. Second largest is Valentine with 2,188, an increase of 22 per cent.

During the 1930 decade, population decreased in both the cities and rural areas in the basin, due to drought, crop failures, and low prices. Lack of employment in the area forced emigration. Present population is less than it was when the area was first intensively settled, soon after the passage of the Kinkaid Act in 1904. This law permitted the homesteading of 640 acres of rangeland, and the open range of the sandhills was rapidly settled. Due to soil and economic conditions the "Kinkaiders" began selling out as soon as they received their land patents, as 640 acres of sandhill land did not support a family.

PUBLIC FACILITIES

A main line of the Chicago-Northwestern Railroad which terminates at Lander, Wyoming, extends through the length of the Nebraska segments of the Niobrara River Basin west of Bassett. A branch of the Chicago-Northwestern Railroad from Norfolk, Nebraska, extends northwestward to Wood, South Dakota, serving parts of the Niobrara Basin, all of the Ponca Basin, and extends into the White River Basin. The Billings-Alliance-Lincoln line of the Chicago, Burlington, and Quincy Railroad cuts across the west end of the area into Wyoming. U. S. Highway No. 20 also extends through the basin into Wyoming. Many good secondary surfaced or graveled roads connect with this road. U. S. Highway No. 18 is located along the northern boundary of this basin from Bonesteel to Mission in South Dakota. U. S. Highway No. 281 crosses the eastern part of the basin, U. S. Highway No. 83 is in the central portion, and U. S. Highway No. 85 is on the western tip.

Public and social facilities are scattered and in some cases are inadequate due to the small and isolated population. Secondary and primary schools are located in the cities in the basin. Theatres and churches and other social establishments are also provided, as shown in Table No. 5. Lack of schools is a problem in rural areas due to the climate, scattered population, and poor roads. It is frequently desirable for families or children to reside in the adjacent city or town to attend schools.

Valentine Substation of the Agricultural Experiment Station, University of Nebraska College of Agriculture, is located in the Niobrara Basin. Current investigations include dual-purpose cattle and development of sub-irrigated meadows. Location of the station and its current work is of value for the eight proposed irrigation developments of the Bureau of Reclamation in the basin.

TRADE AND INDUSTRY

Cities and towns in the area are trading and service centers for the surrounding farm and range areas. Grain elevators, creameries, feed mills, abattoirs, and locker plants are farm service establishments located in most of the communities. Sales rings with heavy traffic are popular with local stockmen and feeder buyers from the corn belt. They are located at the principal towns, the ring at Bassett, Nebraska, reportedly selling more beef cattle than any other country auction market in the United States. A flour and cereal mill is located at Springview, Nebraska. An oil refinery is located at Lusk, Wyoming. Facilities provided by the larger towns and cities within the area are listed in Table No. 5.

The economy of the Niobrara River Basin is based upon beef cattle production. Rangelands are used to produce beef, principally from breeding herds of Hereford cattle. Most operators sell their calves or long yearlings to corn belt feeders in the fall each year. Operations on the farmlands include grain and hay production, some of which is sold for cash. Most of the feed produced on farms is utilized for livestock feed, probably most of it going into beef production. The production of dairy cattle, dual-purpose cattle, hogs, sheep, and poultry are also important enterprises in the farm areas.

LAND AND WATER USE

Agriculture

Many of the so-called "Kinkaiders," (homesteaders of 640 acres under the Kinkaid Act of 1904), came into the sandhills with the idea that the land could be cultivated. They broke the sod in the more favorable locations. Many blowouts occurred immediately due to the frequent

high winds and general lack of knowledge and interest in soil conservation at the time. It is now generally conceded that farming in the sandhills is not to be followed except on small tracts of nearly level land where all conditions are particularly favorable. Grazing and native hay production are the principal land uses.

Other portions of the Niobrara drainage area are used for a combination of farming and livestock production. Cash and feed grain crops are leading enterprises. Native hay, range, and pasture are usually combined with farming.

Dry-land farming is 77 per cent of the land use in the Wyoming portion of the Niobrara Basin, (Wyoming State Engineer, Water Resources of Missouri River in Wyoming, Niobrara River, 1939). This type of use changes to grazing and native hay at the Nebraska line due to the more steeply rolling topography and to the sandhills which start at the line in Sioux County. Box Butte County has fairly good soils and reasonable slopes, and dryfarming again predominates.

Sandhills dominate Sheridan County and extend across Cherry, Brown, and Rock Counties in Nebraska, and in patches on to the mouth of the river. Arable soils on suitable slopes are found in parts of the northern portion of the basin in South Dakota, and north of the river in Nebraska from Valentine eastward. Scattered areas occur on both sides of the river further east in the basin. Dry-land farming is practiced on the suitable soils in this area. Grazing and production of native hay are the major land uses in the northern and eastern parts of the basin because so much of the land is either too rough or too sandy for cultivation. Farming operations are generally combined with livestock production.

Crops are principally grain, mostly corn and oats. Oats are favored because they make the best hay if it becomes advisable to cut small grain crops before they mature because of drought or grasshopper infestation. Rye is grown in the northern and eastern portions of the basin as a winter cover and pasture crop.

Irrigation and Power

Total irrigated area in the Niobrara River Basin was 10,000 acres in 1939. Since that time other projects have been developed, increasing the total irrigated area to more than 25,000 acres. Most important of these is the Mirage Flats Project of 12,000 acres located south of Hay Springs, Nebraska. This project is the culmination of discouraging early day attempts by settlers to irrigate this area. It was started in 1940, under the Water Conservation and Utilization Act of 1939. Water is stored for this project in the Box Butte Reservoir, about 25 miles southwest of Chadron, Nebraska. The storage and canal system were completed

by the Bureau of Reclamation in 1946. Land was acquired and farm units were planned and developed by the Soil Conservation Service. Settlers on the area took over the project water distribution system on December 28, 1950.

There are 2,100 acres under irrigation in the Wyoming segment of the basin, all in small private units served by stream diversions without storage. An additional 3,000 acres is regarded as being potentially irrigable in Wyoming.

In South Dakota 1,000 acres can be irrigated from the lake at Rosebud Community High School on Antelope Creek, a Keya Paha River tributary. This irrigated land is located near Mission, South Dakota. Water for irrigating a small area on Ponca Creek is stored in Willow Creek Reservoir, near Saint Charles, South Dakota. These developments were constructed by the Bureau of Indian Affairs.

Local power needs and the uniform flow of the Niobrara and some of its tributaries have led to the building of five hydroelectric plants in the basin, two on the main stream and three on tributaries.

The Bureau of Reclamation is investigating the potentialities of 13 proposed unit developments in the Niobrara Basin, and one on Ponca Creek drainage. These units include 12 dams and reservoirs, 7 power plants, and 137,900 acres of potentially irrigable land. All of the power plants are in the Niobrara Basin. The Ponca Creek unit consists of a dam, reservoir, and 9,700 acres of potentially irrigable land. All of the proposed developments are located in Nebraska with the exception of 700 acres in the Keya Paha unit, which is in South Dakota near Hidden Timber.

Forest Products, Wildlife, and Recreation

Forest products in the area are limited to posts, poles, and fuel. Prior to the availability of fuel oil, coal, electricity, and bottled gas, suitable fuel was a problem in the region. Early settlers burned knotted hay or buffalo chips in "air-tights," an ingenious hay-burning stove. The pressure of fuel and post needs on the open prairie lands of the region induced the Forest Service to establish the planted Nebraska National Forest, south of Nenzil. At the present time new sources of fuel and posts, and improved economic position of ranchers and farmers in the region have largely relieved the need for a local supply of these necessities. Some bur oak and other native trees occurring in scattered stands in draws, breaks, and canyons in the area are utilized for posts, fuel and poles.

Many of the sandhill lakes, marshlands, and creeks provide excellent waterfowl hunting. Pheasants are prevalent in the area, especially in the northern part along the Keya Paha River. Mourning doves, quail, cottontails, and jackrabbits inhabit the area. A limited number of fur bearers, including skunks, beaver, badger, mink, muskrats, raccoon, and jackrabbits provide trapping. Limited numbers of mule deer live in the breaks along the Niobrara River.

Trout inhabit the upper reaches of the Niobrara River and some of its spring-fed tributaries. Other stream fishery is limited. Ponds and lakes in the region provide warm water fish, including bass, crappie, perch, bullheads and sunfish.

Valentine National Wildlife Refuge is a sandhills lake resting-grounds for migratory waterfowl. Other smaller refuges in the area also provide flyway rests for waterfowl in the area. Fort Niobrara Wildlife Refuge at Valentine, Nebraska, is stocked with buffalo and elk. A herd of Longhorn cattle is also located there. These cattle were established here to perpetuate a type important historically in the region.

Recreation in the area includes that provided by the state parks, hunting, fishing, skating, and the local fairs and rodeos. The fair at Valentine, Nebraska, is notable nationally for the display of horsemanship and horses in cattle-cutting exhibitions. Sheep dog trials, which attract national attention, are held here annually. Local Indians in native regalia exhibit their dancing and music at the fairs.

LAND PROBLEMS AND PROPOSED ADJUSTMENTS

Niobrara River Basin, including Ponca Creek Basin, was delineated for study on the basis of the 13 proposed development units of the Bureau of Reclamation. The Corps of Engineers, Department of the Army, has considered seven dam sites and an alternate single site on the Niobrara River and two on Ponca Creek. The effect of these 23 units on the public domain land in the area has been considered.

About 96 per cent of the land within the Niobrara River area is in state and private ownership at the present time. The remainder is controlled by various Federal agencies. Unreserved public domain consists of 6,492 acres, of which 755 acres are located in Wyoming. Cherry County, the largest county in Nebraska, contains 3,101 acres of public domain. One of the largest holdings of public lands at the present time is the Niobrara Division of the Nebraska National Forest, 115,658 acres in size. Tree planting began in 1903, and approximately 5,000 acres have been planted with Rocky Mountain juniper and several species of pine. The remainder of land in this division of the forest is grassland and is used by local stockmen under a system of allotments. Other large holdings

under Federal supervision are the Valentine National Wildlife Refuge, consisting of 69,754 acres located a few miles south of Valentine, Nebraska; and Fort Niobrara National Wildlife Refuge consisting of 19,122 acres, located a short distance northeast of Valentine, Nebraska. In addition there is the Box Butte Refuge, consisting of 2,210 acres located in Dawes County, Nebraska.

Ponca and Santee are two small Indian reservations located in Nebraska in the vicinity of the mouth of the Niobrara River. They contain 9,866 acres of Indian land, 7,928 acres of which is allotted and 1,938 acres of tribal land. Part of the Rosebud Indian Reservation, located in Todd, Tripp, and Gregory Counties in South Dakota, drains into the Niobrara River and Ponca Creek. The Niobrara Basin in South Dakota includes 73,600 acres of Indian allotted trust land, 7,040 acres of Federal Government school land, and 8,000 acres of submarginal purchased Title III land. All of this land is administered by the Bureau of Indian Affairs. The submarginal purchased land is under the ownership of the Department of Agriculture. Niobrara River drains 1,152 square miles in South Dakota. Ponca Creek Basin includes 20,000 acres of Indian trust allotted land in South Dakota, and drains 391 square miles in that state. For distribution of land areas in the Niobrara River and Ponca Creek Basin see Table No. 6.

The Nebraska Game, Forestation, and Parks Commission operates eight parks and recreation grounds and one fish hatchery in the Niobrara Basin. The total area of the nine developments is 4,406 acres. The size and location of each development is shown on the map accompanying this report.

Soil conservation districts have been organized, generally along county lines, and now cover all of Nebraska located within the Niobrara River drainage area, except the southwest portion of Cherry County.

Two power site reservations were established in 1913, reserving public domain along the Niobrara River in Township 33 North, Range 27 West, and Township 34 North, Range 27 West. These sites are immediately adjacent to the Fort Niobrara National Wildlife Refuge.

The unreserved public domain lands within the Niobrara River Basin have been classified into the following categories:

1. Lands to be retained by the Federal Government pending determination of their value for proposed developments.
2. Lands to be transferred to other Federal agencies, particularly to the Forest Service for use in their program.
3. Land offering recreational and wildlife conservation possibilities.

4. Land having insignificant value in connection with Federal or state programs, being primarily suitable for use in connection with privately-owned lands. A discussion of each category follows:

1. Lands to be retained by the Federal Government

In this category would fall lands along streams which might be inundated by projects now being planned by the Corps of Engineers or the Bureau of Reclamation. Where this possibility exists, it would not be advisable to dispose of any public domain land at this time because of the possibility that it might have to be reacquired at some later date. Therefore, the recommendation is made that no action be taken regarding disposal until it is definitely and finally determined whether such lands will be needed by either of these two agencies.

In 1934, 95.7 acres of public domain land in the State of Nebraska were withdrawn from all forms of entry by Executive Order. This is the same order which withdrew considerable land along the Missouri River in South Dakota due to the presence of selenium in toxic quantities in the soil. The selenium problem is no longer acute and plans are pending for the revocation of the withdrawal order.

2. Lands to be transferred to other Federal agencies

There are 16 tracts of public domain lands in Cherry County, Nebraska, containing 865.55 acres, which either touch a boundary of the Niobrara Division of the Nebraska National Forest or are located in its vicinity. The officials of the Forest Service have expressed an interest in acquiring these lands primarily to eliminate through exchanges some private holdings within the forest boundaries or to straighten out the exterior boundaries of the forest.

3. Lands offering recreational or wildlife conservation possibilities

Along the Missouri River, the Niobrara River, and one of the Niobrara's main branches, the Keya Paha River, there are a number of tracts of varying sizes, the chief value of which appears to be for recreational or wildlife conservation purposes. While their varying and usually small size limits their use for such purposes alone, they could be incorporated with adjacent land to form a wildlife conservation area. Accordingly, it is recommended that appropriate Federal or state agencies be contacted relative to their interest in public domain lands in such locations. In this connection it should be pointed out that some of the land recommended for retention because of the possibility of being inundated may not be needed when the units are completed. It appears that the highest use for this land would then be for wildlife protection cover.

4. Land suitable for disposal

Most of the unreserved public domain land in the Niobrara River Basin is suitable for disposal to private ownerships. The public domain land is in small tracts surrounded by privately-owned grazing land, so that the grazing resources could be more effectively managed and utilized under private ownership. These tracts of public domain land cannot be efficiently nor effectively managed at the present because of their scattered pattern and small size. Disposition of this land would create no public land problem and would not have any adverse effect upon the local economy. Location and size of each parcel of public domain land is shown on the map accompanying this report. Each piece of public domain is described, classified, appraised, and considered for retention or disposal in Table No. 7

Table 6.- Facilities provided by towns and cities within the Niobrara River and Poncha Creek Basins, Nebraska, South Dakota, and Wyoming, 1951 1/

Cities and Towns	Grain Sch.	High Sch.	Church	Hospital	Food Store	Hardware	Clothing	Feed Deal.	Machinery	Lumber Yd.	Fuel Plant	Elevator	Sales Bldg.	Creamery	Poultry	Cream Sta.	Theatre	Lodges	Other Rec.	Highways	RR Siding	RR Depot	Truck Line	Garage	Bank	Hotel	Restaurant	Population
<u>Nebraska</u>																												
Hinsworth	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	U 20 S 7	X	X	X	X	X	X	X	2,142
Arcada	X		X		X			X																				117
Atkinson	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	U 20 S 11	X	X	X	X	X	X	X	1,261
Bassett	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	U 143 U 20 S 12	X	X	X	X	X	X	X	1,065
Butte	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	S 17 U 20			X	X	X	X	X	623
Cody	X	X	X	X	X	X		X	X	X	X	X			X	X	X	X	X	U 20	X	X	X	X	X	X	X	375
Crockston	X	X	X		X	X		X	X	X	X	X			X	X				U 20 BIA U 20	X	X	X	X		X	X	262
Eli	X		X		X			X							X	X					X		X	X			X	77
Gordon	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	U 20 S 27	X	X	X	X	X	X	X	2,047
Hay Springs	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	U 20 S 87	X	X	X	X	X	X	X	1,035
Hemingford	X	X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	S 2 S 27 U 20	X	X	X	X		X	X	790
Johnstown	X	X	X		X	X		X	X	X					X	X				U 20	X	X	X	X				175
Millgrove	X	X	X		X	X		X	X	X	X	X			X	X	X	X		U 20	X		X	X	X	X	X	173
Long Pine	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	U 20	X	X	X	X	X	X	X	824
Lynch	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	S 12	X	X	X	X	X	X	X	487
Marion	X	X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	U 20 S 61	X	X	X	X	X	X	X	321
Meyer	X	X	X		X			X	X						X	X				S 12			X	X		X	X	195
Niobrara	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	S 14 S 12	X	X	X	X	X	X	X	629
O'Neill	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	U 231 U 20	X	X	X	X	X	X	X	3,050
Russville	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	U 20	X	X	X	X	X	X	X	1,261
Spencer	X	X																										635
Springview	X	X	X	X	X	X	X	X	X			X			X	X	X	X	X	U 133 S 72 U 20			X	X	X	X	X	347
Valentine	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	U 20	X	X	X	X	X	X	X	2,128
Verdigre	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	S 34 S 14 U 20	X		X	X	X	X	X	556
Wood Lake	X	X	X		X	X	X	X	X	X	X	X			X	X	X	X	X	U 20	X	X	X	X	X	X	X	293
<u>South Dakota</u>																												
Burke	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	U 13	X	X	X	X	X	X	X	602
Colome	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	U 183 U 12	X	X	X	X	X	X	X	509
Fairfax	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	U 221 S 54								333
Gregory	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	U 13 S 47 Co.	X	X	X	X	X	X	X	1,376
Millboro	X				X																		X					102
Missior.	X	X	X		X	X		X	X						X	X	X	X	X	U 13 U 33			X	X		X	X	452
<u>Wyoming</u>																												
Lusk	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	U 18	X	X	X	X	X	X	X	2,078
Manville	X	X	X	X	X	X		X	X	X	X	X			X	X				U 20	X		X	X			X	240
Node	X				X			X				X			X	X				U 20				X				200

1/ S - State Highway number
U - United States Highway number
BIA - Bureau of Indian Affairs road
Co. - County road

Table 6.- Distribution of landownership and administration,
Niobrara River and Ponca Creek Basins;
South Dakota, Nebraska, and Wyoming, 1951

Ownership and Administration	Acreage	Total Acreage
<u>DEPARTMENT OF THE INTERIOR</u>		
<u>Bureau of Indian Affairs</u>		
Tribal and Allotted Trust Land	103,466	
Federal Reserves	7,040	
Purchased Title III Land	3,000	
Total		113,506
<u>Fish and Wildlife Service</u>		
National Wildlife		91,036
<u>Bureau of Land Management</u>		
Public Domain	6,492	
Withdrawals	712	
Total		7,204
Total, Department of the Interior Lands		216,796
<u>DEPARTMENT OF AGRICULTURE</u>		
<u>Forest Service</u>		
Nebraska National Forest		115,653
Total, Federal Lands		332,454
<u>PRIVATE AND STATE</u>		
State Parks, Refuges, and Hatcheries	4,406	
State and Private Land	3,387,620	
Total, Private and State Lands		8,392,026
GROSS AREA, NIOBRARA RIVER AND PONCA CREEK BASIN		8,724,480

Table 7.- Description, area, classification, and appraisal of unreserved public domain land within the
Miohara River and Ponca Creek Basins; Nebraska, South Dakota, and Wyoming, 1951

Sixth Principal Meridian

County	Typ.	Rgs.	Sec.	Subdivision	Acres	General Land Character	Present Land Use	Land Capability Classification	Principal Suitability	Proposed Management	Total Appraised Value (Dollars)
NEBRASKA	Box Butte	28 N.	47 W.	Lot 2	85.21	Rolling sandhill land	Grazing	V	Grazing	Private	553.92
				Lots 1 and 2							
				Lots 1, 2, and 3							
	Boyd	32 N.	9 W.	Lot 8	1.25	Washed away	None	VIII	Flood Control	Federal	3.20
			10 W.	Lot 4	14.00	Level—land in Miohara	Grazing	VIII	Flood Control	Federal	
			10 W.	Lot 1	1.60	Level—river bottom land	None	VII	Wildlife	State	
			11 W.	Lot 6	14.20	Level—mostly sand bars	None	VIII	Flood Control	Federal	
			13 W.	Lot 4	8.65	Washed away	None	VIII	Flood Control	Federal	
			10 W.	NW¼NE¼	40.00	Rough hills and breaks	Grazing	VII	Grazing	Private	
			11 W.	Lot 5	15.53	Slightly sloping	Agriculture	II	Agriculture	Private	
Brown	34 N.	15 W.	22	Lot 7	17.10	Level—tree-covered—eroded	Grazing	VII	Grazing	Private	465.90
			22	Lot 4	37.41	Rolling—cut by draws	Grazing	VII	Grazing	Private	
			6	NE¼SW¼	40.00	Rolling—cut by draws	Grazing	VII	Grazing	Private	
			16 W.	Lot 1	24.65	Steeply sloping	Grazing	VII	Grazing	Private	
			33	Lot 1	24.65	Steeply sloping	Grazing	VII	Grazing	Private	
			10 W.	SW¼SE¼	40.00	Rolling sandhills	Grazing	VI	Grazing	Private	
			24 W.	SW¼SW¼	40.00	Rolling sandhills	Grazing	VII	Grazing	Private	
	32 N.	22 W.	2	Lot 9	0.14	River bottom—scattered trees	Grazing	VII	Water Storage	Federal	560.00
			3	Lot 9	0.40	River bottom—scattered trees	Grazing	VII	Water Storage	Private	
			5	Lot 9	160.00	Rough sandhills	Grazing	VII	Grazing	Private	
Cherry	28 N.	37 W.	23 W.	NW¼SW¼	40.00	Rolling sandhills	Grazing	VII	Grazing	Private	140.00
			23 W.	SE¼NE¼	40.00	Rolling sandhills	Grazing	VII	Grazing	Private	
			23 W.	Lot 7	16.01	River bottom—scattered trees	Grazing	VIII	Water Storage	Federal	
			23 W.	Lot 5	18.70	River bottom—scattered trees	Grazing	VIII	Water Storage	Federal	
			24 W.	Lot 4	0.06	River bottom—scattered trees	Grazing	VIII	Water Storage	Federal	
			25	SW¼NE¼	40.00	Rolling sandhills	Grazing	VII	Grazing	Private	
			27	SW¼SW¼	40.00	Rolling sandhills	Grazing	VII	Grazing	Private	
	33 N.	27 W.	28	E¼SE¼	120.00	Rolling sandhills	Grazing	VII	Grazing	Private	420.00
			21	SE¼SW¼	40.00	Rolling sandhills	Grazing	VII	Grazing	Private	
			8	NW¼SW¼	40.00	Rolling sandhills	Grazing	VII	Grazing	Private	
Boyd	29 N.	30 W.	9	NW¼SE¼	40.00	Under water	Wildlife	VIII	Wildlife	State	50.00
			22	SE¼NW¼	80.00	Rolling sandhills	Grazing	VII	Grazing	Private	
			15	Lots 1, 2, 3, and 4	14.00	Rolling sandhills	Grazing	VI	Grazing	Private	
			14	Lots 1, 2, 3, and 4	24.04	Great of hill	Grazing	VII	Wildlife	Federal	
			15	Lots 1, 2, 3, and 4	40.00	Under water	None	VIII	Wildlife	State	
			29	NE¼SE¼	157.08	Power site classification No. 408	Grazing	VII	Grazing	Private	
			3	Lot 1, SW¼NW¼	40.00	Power site classification No. 408	Grazing	VII	Grazing	Private	
	34 N.	27 W.	4	Lot 1, 7, 8, 10, and 13	200.59	Power site classification No. 408	Grazing	VII	Grazing	Private	200.00
			5	Lot 6, NW¼SW¼	23.40	Power site classification No. 408	Grazing	VII	Grazing	Private	
			8	Lots 1, 4, 5, and 8	215.31	Power site classification No. 408	Grazing	VII	Grazing	Private	
Boyd	29 N.	36 W.	22	Lot 1, 5, and 8	85.98	Power site classification No. 408	Grazing	VII	Grazing	Private	277.06
			27	Lots 1 and 4	18.40	Power site classification No. 408	Grazing	VII	Grazing	Private	
			34	Lots 2 and 3	11.16	Power site classification No. 408	Grazing	VII	Grazing	Private	
			34	Lot 3	40.00	Power site classification No. 408	Grazing	VII	Grazing	Private	
			33	NE¼NE¼	80.00	Rolling sandhills	Grazing	VII	Grazing	Private	
			16	SE¼NE¼	79.16	Rolling sandhills	Grazing	VII	Grazing	Private	
			11	NW¼NW¼	80.00	Rolling sandhills	Grazing	VII	Grazing	Private	
	30 N.	31 W.	12	NW¼NE¼	42.51	Rough sandhills	Grazing	VII	Grazing	Federal	124.62
			1	NE¼NE¼	40.00	Rolling sandhills	Grazing	VII	Grazing	Federal	
			6	NE¼SW¼	40.00	Rolling sandhills	Grazing	VII	Grazing	Federal	

Charry	30 N.	31 W.	35	SWNE 1/4 2/	40.00	Rolling sandhills	Grazing	VII	200.00
	30 N.	32 W.	9	SE 1/4 2/	40.00	Rough sandhills	Grazing	VII	100.00
	30 N.	34 W.	29	SW 1/4 2/					
	30 N.	35 W.	10	SE 1/4 2/	80.00	Rolling sandhills	Grazing	VII	400.00
	30 N.	36 W.	13	SW 1/4 2/	80.00	Rolling sandhills	Grazing	VII	320.00
	30 N.	37 W.	17	SWNE 1/4	80.00	Rolling sandhills	Grazing	VII	320.00
	30 N.	38 W.	26	NE 1/4 2/	40.00	Rolling sandhills	Grazing	VII	180.00
	30 N.	39 W.	27	NE 1/4 2/	360.00	Rolling sandhills	Grazing	VII	1,080.00
	31 N.	25 W.	11	SWNE 1/4	160.00	Rolling sandhills	Grazing	VII	480.00
	31 N.	30 W.	31	Lot 4 2/	42.52	Rolling sandhills	Grazing	VII	127.82
	31 N.	34 W.	33	NE 1/4 2/	40.00	Rolling sandhills	Grazing	VII	120.00
	31 N.	37 W.	20	SE 1/4 2/	160.00	Rolling sandhills	Grazing	VII	160.00
	31 N.	37 W.	11	SW 1/4 2/	40.00	Rolling sandhills	Grazing	VII	200.00
	32 N.	26 W.	30	Lot 2	41.20	Rolling sandhills	Grazing	VII	164.80
	32 N.	30 W.	29	SW 1/4 2/	36.33	Sloping and rolling	Grazing	VI	145.32
	32 N.	31 W.	1	Lots 1 and 2 2/	80.00	Rolling sandhills	Grazing	VII	160.00
	32 N.	36 W.	2	Lot 1 and 2	24.95	Rolling sandhills	Grazing	VI	124.20
	33 N.	25 W.	4	Lot 1	57.40	Sloping and rolling	Grazing	VII	287.00
	33 N.	27 W.	19	Lot 2	1.70	River bottom--scattered trees	Water Storage	VII	
	33 N.	28 W.	3	Lot 4	0.50	River bottom--scattered trees	Wildlife	VI	2.50
	33 N.	29 W.	8	SE 1/4 2/	39.01	Rolling sandhills	Grazing	VII	234.06
Holt	33 N.	33 N.	3	NE 1/4 2/	40.00	Rolling sandhills	Grazing	VII	200.00
	33 N.	33 N.	28	NE 1/4 2/	40.00	Rolling sandhills	Grazing	VII	160.00
	33 N.	33 N.	31	SW 1/4 2/	79.54	Rolling sandhills	Grazing	VII	240.00
	33 N.	33 N.	31	SW 1/4 2/	40.00	Rough sandhills	Grazing	VII	557.78
	33 N.	33 N.	31	SW 1/4 2/	40.00	Rough sandhills	Grazing	VII	100.00
	33 N.	33 N.	31	SW 1/4 2/	40.00	Rough sandhills	Grazing	VII	120.00
	33 N.	33 N.	31	SW 1/4 2/	39.26	Rolling sandhills	Grazing	VII	194.30
	33 N.	33 N.	31	SW 1/4 2/	79.57	Rolling sandhills	Grazing	VII	467.42
	33 N.	33 N.	26	SWNE 1/4	80.00	Rolling sandhills	Grazing	VII	320.00
	33 N.	33 N.	26	SWNE 1/4	40.00	Rolling sandhills	Grazing	VII	120.00
	33 N.	33 N.	26	SWNE 1/4	80.00	Rolling sandhills	Grazing	VII	280.00
	33 N.	33 N.	27	SWNE 1/4	160.00	Rough sandhills	Grazing	VII	480.00
	33 N.	33 N.	23	SWNE 1/4	80.00	Rolling sandhills	Grazing	VII	280.00
	33 N.	33 N.	23	SWNE 1/4	40.00	Rolling sandhills	Grazing	VII	220.00
	33 N.	33 N.	20	SWNE 1/4	40.00	Rolling sandhills	Grazing	VII	180.00
	32 N.	12 W.	1	Lots 3 and 4, SWNE 1/4	177.02	Rolling sandhills	Grazing	VI	708.08
	32 N.	13 W.	22	SWNE 1/4	40.00	Rolling sandhills	Grazing	VII	200.00
	33 N.	13 W.	15	SE 1/4 2/	6.10	Bare sand bars in river	None	VII	
	33 N.	14 W.	15	SW 1/4 2/	40.00	Rolling sandhills	Grazing	VI	140.00
	33 N.	14 W.	22	NE 1/4 2/	40.00	Rolling sandhills	Grazing	VI	140.00
Keya Paha	32 N.	18 W.	17	Lot 5	6.70	Sloping--scattered trees	Grazing	VII	20.10
	34 N.	18 W.	6	Lot 1	15.65	Sloping--scattered trees	Grazing	VII	20.25
	35 N.	18 W.	20	Lot 1	38.08	Sloping--scattered trees	Grazing	VII	171.36
	35 N.	19 W.	21	Lot 2	5.40	Fairly level	Grazing	VII	
	35 N.	19 W.	26	Lot 1	21.20	Fairly level	Grazing	VII	
	35 N.	19 W.	38	Part north of the river	406.58	River bottom to hilly	Agriculture	210-II	7,225.40
	35 N.	21 W.	13	Lots 1, 2, 3, and 4	11.24	Rolling	Grazing	194.58-VI	44.96
	35 N.	23 W.	15	Lots 1, 2, 3, and 4	12.58	Rolling	Grazing	VI	51.32
	35 N.	23 W.	18	Lots 1 and 2	14.20	Rolling	Grazing	IV	52.60
	35 N.	23 W.	18	Lots 1 and 2	43.90	Largely eroded away	None	VIII	
Knox	31 N.	7 W.	4	Lot 1			None		
	32 N.	6 W.	5	Lot 4			None		
	32 N.	6 W.	6	Lot 4			None		
	32 N.	6 W.	7	Lot 1			None		
	32 N.	6 W.	7	Lot 9	2.85	Largely eroded away	Grazing	VIII	
	32 N.	7 W.	31	Lot 2	2.10	Considerable accretion, tree-covered	Grazing	VII	
	32 N.	8 W.	33	Lot 1	9.90	Level--tree-covered	Grazing	VII	
	32 N.	8 W.	33	Lot 1	7.00	River bottom--tree-covered	Grazing	VII	21.00
	32 N.	8 W.	33	Lot 1	10.15	Island	Wildlife	VII	30.40
	32 N.	8 W.	33	Lot 3	10.15	Island	Wildlife	VII	
	33 N.	7 W.	25	Lot 1	3.27	Washed away	None	VIII	
	33 N.	7 W.	30	SWNE 1/4	40.00	Rolling sandhills	Grazing	VII	200.00
	33 N.	7 W.	30	SWNE 1/4	118.62	Washed away	None	VII	
	33 N.	7 W.	21	Lots 1, 2, 3, and 4, NE 1/4 SE 1/4					
	33 N.	7 W.	21	Lot 1					
	33 N.	7 W.	22	Lots 1 and 2					
	33 N.	7 W.	22	Lot 3					
	33 N.	7 W.	26	Lots 1 and 2, SWNE 1/4					
	33 N.	7 W.	27	Lots 1 and 2, SWNE 1/4					
	33 N.	7 W.	27	Lots 1 and 2, SWNE 1/4	412.73	Largely part of island now	Grazing	VII	

Table 7.- Description, area, classification, and appraisal of unreserved public domain land within the Niobrara River and Ponca Creek Basins; Nebraska, South Dakota, and Wyoming, 1951--Continued

6th Principal Meridian

County	Twp.	Rge.	Sec.	Subdivision	Acres	General Land Character	Present Land Use	Land Capability Classification ^{1/}	Principal Suitability	Proposed Management	Total Appraised Value (Dollars)
NEBRASKA	34 N.	41 W.	24	SE ^{1/4} SW ^{1/4}	40.00	Rolling sandhills	Grazing	VII	Grazing	Private	120.00
	35 N.	41 W.	35	SW ^{1/4}	40.00	Rolling sandhills	Grazing	VII	Grazing	Private	120.00
	26 N.	58 W.	12	Lots 2 and 3	15.15	Sloping prairie land	Grazing	V	Grazing	Private	75.75
	28 N.	56 W.	12	EW ^{1/4} , NW ^{1/4} , NE ^{1/4} SW ^{1/4}	160.00	Rough and broken prairis land	Grazing	VI	Grazing	Private	480.00
WYOMING	31 N.	57 W.	9	NE ^{1/4}	40.00	Broken prairis land	Grazing	VI	Grazing	Private	180.00
					6,448.34						24,552.55
Nebraska	29 N.	60 W.	3	Lots 1 and 4	54.99	Undulating	Grazing	V	Grazing	Private	329.94
			15	Lots 1 and 2	65.97	Undulating	Grazing	V	Grazing	Private	395.82
	39 N.	60 W.	15	Lots 1, 2, and 3	35.57	Undulating	Grazing	V	Grazing	Private	213.42
			34	Lots 1, 2, 3, and 4	44.72	Undulating	Grazing	V	Grazing	Private	268.32
Nebraska	31 N.	62 W.	2	Lot 4	40.92	Rolling	Grazing	VI	Grazing	Private	204.60
	31 N.	64 W.	4	Lot 1	41.43	Sloping	Grazing	VI	Grazing	Private	160.00
			5	SE ^{1/4} , NE ^{1/4} SW ^{1/4}	80.00	Hilly	Grazing	VII	Grazing	Private	240.00
			8	SE ^{1/4} , NE ^{1/4} SE ^{1/4}	80.00	Hilly	Grazing	VII	Grazing	Private	240.00
			9	NW ^{1/4}	40.00	Sloping	Grazing	VI	Grazing	Private	240.00
	32 N.	60 W.	27	Lots 1, 2, 3, and 4	56.97	Rolling to hilly	Grazing	VI	Grazing	Private	399.00
			3	Lot 3	15.26	Level	Grazing	VI	Hayland	Private	153.60
	33 N.	60 W.	4	SW ^{1/4}	40.00	Steeply rolling	Grazing	VII	Grazing	Private	240.00
			22	Lots 1 and 2	45.33	Gently rolling	Grazing	VII	Grazing	Private	240.00
			27	Lots 1 and 2	14.44	Gently rolling	Grazing	VI	Grazing	Private	126.65
			29	SW ^{1/4}	40.00	Gently rolling	Grazing	VI	Grazing	Private	72.20
	32 N.	64 W.	33	NW ^{1/4}	40.00	Sloping	Grazing	VI	Grazing	Private	160.00
											160.00
					755.70						3,563.55
Wyoming Total											
Total unreserved public domain, Wyoming & Nebraska					6,492.42						27,956.10
Total power site withdrawals, Nebraska					712.12						No value
GRAND TOTAL					7,204.54						27,956.10

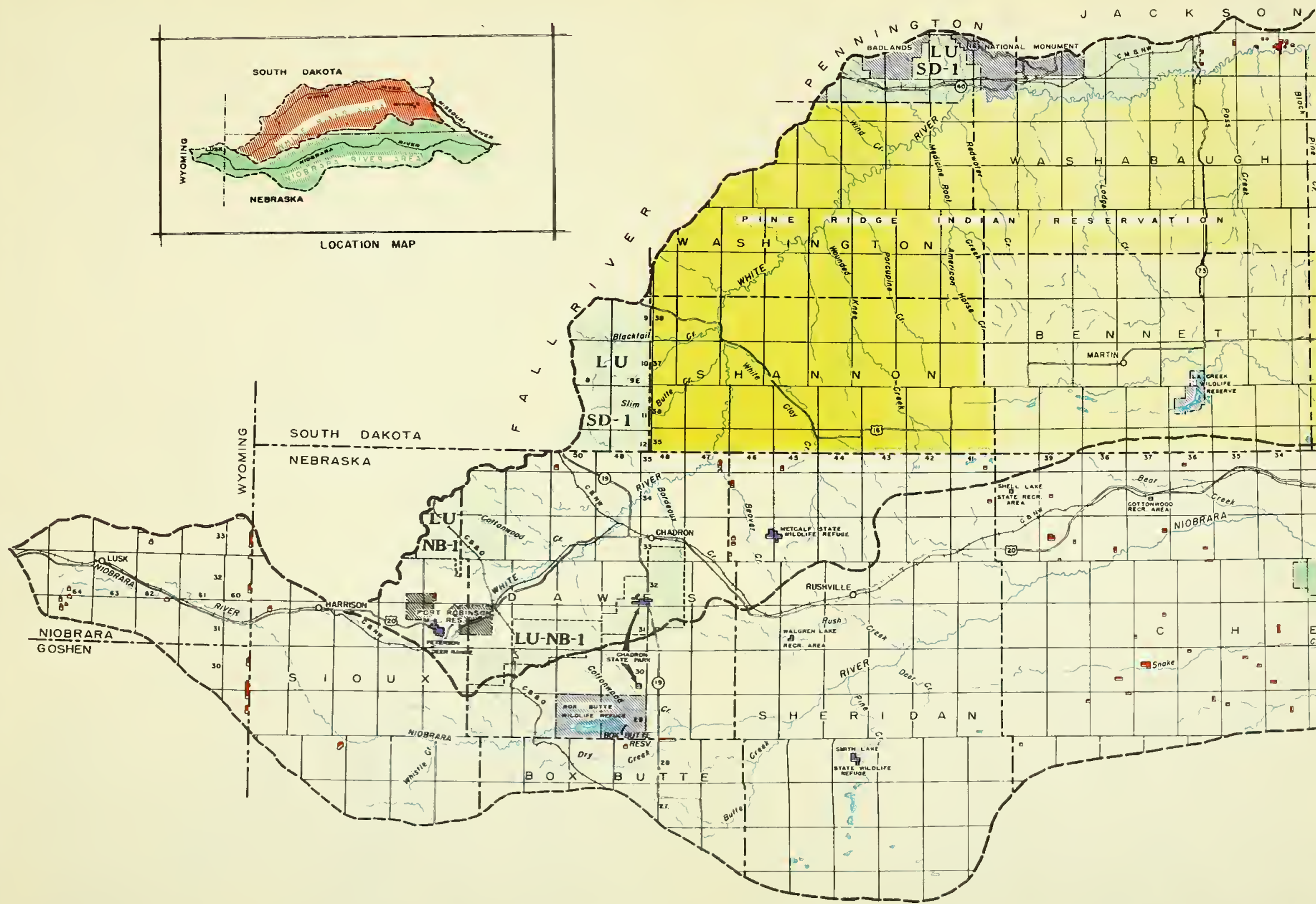
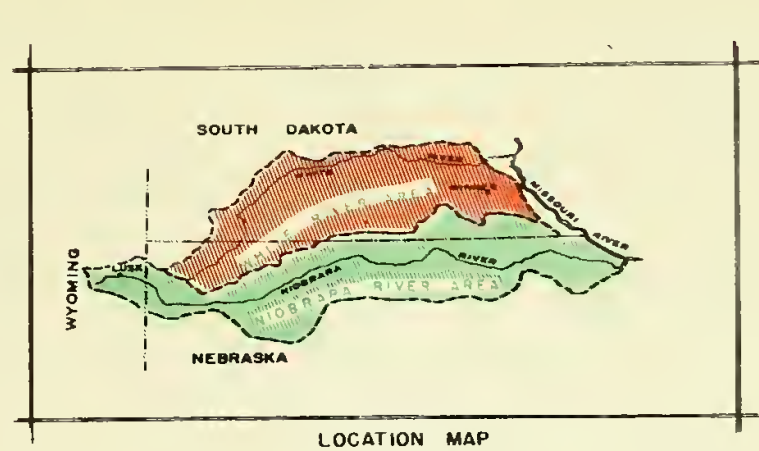
^{1/} See table 8 for description and definition of classes.

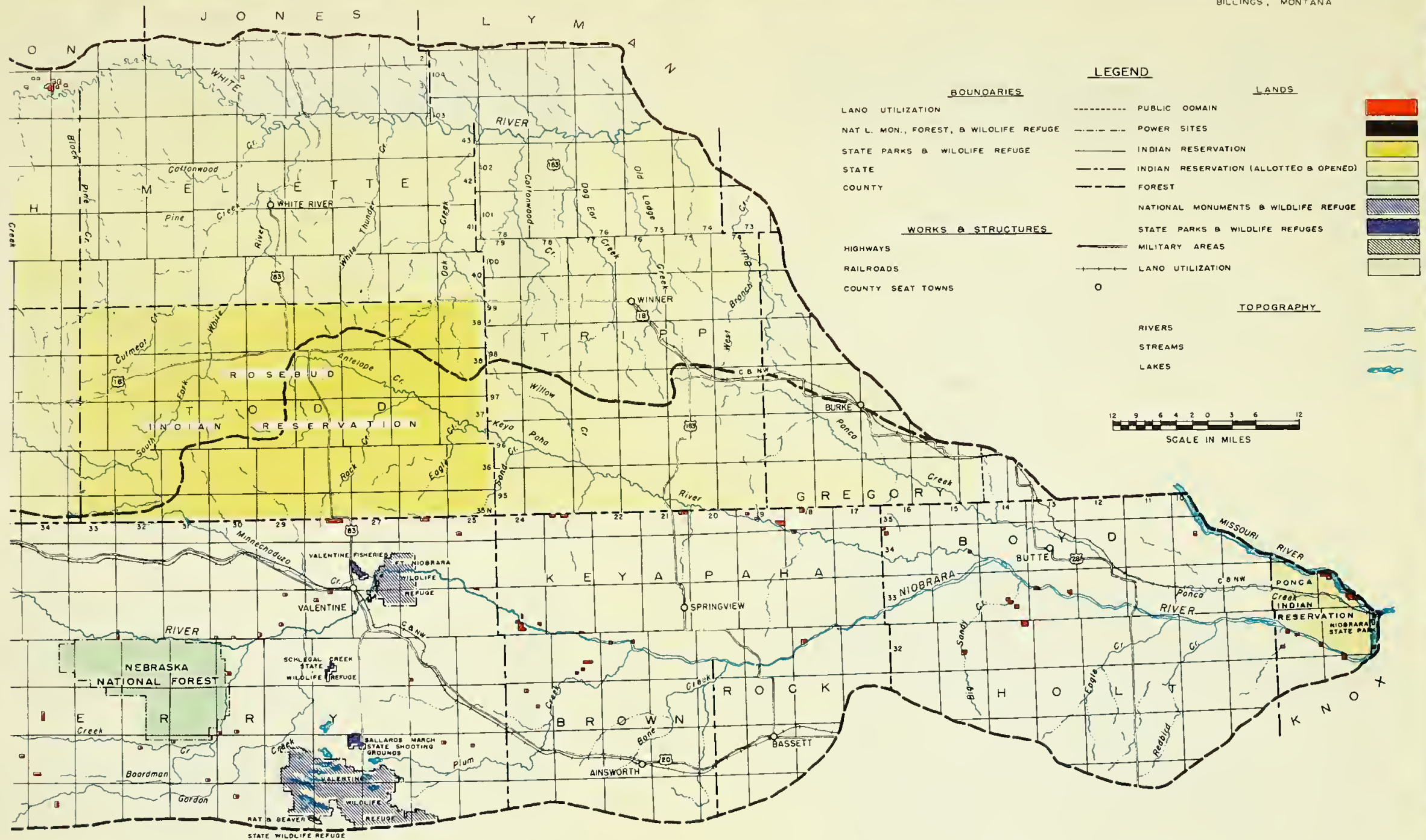
^{2/} Lands reserved for the Forest Service to consolidate their ownership within the Nebraska National Forest.

Table 3.- Description and definitions of land-use capability classes 1/

Class	Suitable for	Topography		Characteristic Native Vegetation	Soil Characteristics				Vulnerability to Erosion	Requisite Special Practices
		Slope (percent)	Character of Surface		Texture	Depth	Relative Salinity	Fertility Productivity		
I	Best type of farming land	0 to 2	Level or nearly level	Tall and mid-grasses, thrifty sagebrush, deciduous trees	Medium, friable	12" or more; subsoil 36" or more	Negligible	Good to High	Low	None to minor
II	Farming with simple conservation practices	0 to 10	Irregular	Tall, mid, and short grasses; big sagebrush, deciduous trees	Light to heavy; friable	8" or more; subsoil 36" or more	Negligible to slight	Moderate to High	Slight to moderate	Minor to simple practices
III	Farming with complex conservation practices	0 to 10	Irregular	Tall, mid, and short grasses; big sagebrush, rabbitbrush, greasewood, coniferous, and deciduous trees	Light to heavy; friable	6" or more; subsoil 24" or more	Slight to moderate	Moderate to High with management	Moderate to High	Complex practices essential
IV	Limited or occasional cultivation; best for permanent hay or pasture	0 to 15	Irregular or stony	Tall, mid, and short grasses; big sagebrush, rabbitbrush, greasewood, coniferous, deciduous trees, saltbush, winter-fat	Sandy to clay; porous or tight	6" or more; may have shallow hardpan	Negligible to critical	Poor for row crops; best for hay and pasture	Moderate to High	Complex and intensive practices with good management
V	Range or woodland; farming only if irrigation water becomes available	0 to 5	Smooth to irregular; may be stony	Tall, mid, and short grasses; big sagebrush, rabbitbrush, greasewood, coniferous, and deciduous trees Density .3 or more	Light to heavy; friable	Good permeability to 24" depth	Negligible to moderate	Moderate to High; not over three acres per A. U. M.	Low	None to minor
VI	Range and woodland only	0 to 20 (greater only on good soils)	Irregular to rough or rocky	Tall, mid, and short grasses; big sagebrush, rabbitbrush, greasewood, coniferous, deciduous trees, saltbush, winter-fat Density .3 or more	Very light to heavy	Shallow to moderate; permeability excessive to poor	Negligible to moderate	Light to Moderate; 3-10 acres per A. U. M.	Moderate	Proper management with simple restrictions
VII	Range and woodland with severe restrictions	0 to 100	Rough, rocky, or eroded	Tall, mid, and short grasses; big sagebrush, rabbitbrush, greasewood, coniferous, deciduous trees, saltbush, winter-fat, mountain browse and annuals Density under .3	Any: May be tight clay or open sand or gravel	Often shallow, poorly developed	Negligible to critical	Poor to Light; over 10 acres per A. U. M.	High	Proper management with complex restrictions and intensive practices
VIII	Watershed, wildlife and recreation	Generally steep	Extremely rough, barren or inaccessible	Often only annuals or scanty perennials; may be dense coniferous timber	Usually poorly developed	Very shallow or nil	May be excessive for plant growth	Usually very low or nil	High (unless a swamp)	Complete protection

1/ Adapted from Soil Conservation Service Standards, U. S. Department of Agriculture. Any one of the factors listed may classify a soil, factors determining classification singly, not necessarily in combination.





UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
DIVISION OF PLANNING

WHITE & NIOBRARA RIVER AREAS

PUBLIC DOMAIN MAP

WYO., NEB., & SO. DAK.

LIBRARY CARD

1951
Land
ion III.
d report as

OFFICE	DATE RETURNED

(Continued on reverse)

HD 243 .S8 L3635 1951
U. S. Bureau of Land
Management. Region III.
Land planning and
classification report as

BLM LIBRARY
RS 150A BLDG. 50
DENVER FEDERAL CENTER
P.O. BOX 25047
DENVER CO 80225

